Lifting & Bracing
**Precast Lifting**

Leviat®
A CRH COMPANY

# Halfen HD Socket Lifting System

Imagine. Model. Make.

Leviat®
A CRH COMPANY

# We imagine, model and make engineered products and innovative construction solutions that help turn architectural visions into reality and enable our construction partners to build better, safer, stronger and faster.

**Leviat is a world leader in connecting, fixing, lifting and anchoring technology.**

From the build of new schools, hospitals, homes and infrastructure, to the repair and maintenance of heritage structures, our engineering skills are making a difference around the world.

We provide technical design assistance at every stage of a project, from initial planning to installation and beyond.

Our technical support services range from simple product selection through to the development of a fully customised project-specific design solution.

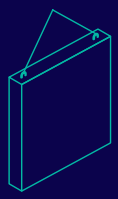
Every promise we make locally, has the commitment and dedication of our global team behind it. We employ almost 3,000 people at 60 locations across North America, Europe and Asia-Pacific, providing an agile and responsive service worldwide.

**Leviat, a CRH company, is part of the world's leading building materials business.**

**>3,000**
People

**60+**
Locations

**~20**
Countries

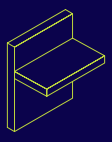


### Lifting & Bracing

Systems for the safe and efficient transportation, lifting and temporary bracing of cast concrete elements and tilt-up panels before permanent structural connections are made.

- Precast Lifting
- Tiltup Lifting
- Bracing & Anchorage

## Other areas of expertise:

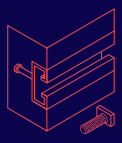


### Structural Connections

Systems to form robust, efficient connections, and continuity of concrete reinforcement as necessary, between walls, slabs, columns, beams and balconies, providing structural integrity as well as enhanced thermal and acoustic performance.

### Façade Support & Restraint

Systems for the safe and thermally-efficient fixing of the external building envelope, including brick and natural stone, insulated sandwich panels, curtain walling and suspended concrete façades, and also the repair and strengthening of existing masonry installations.

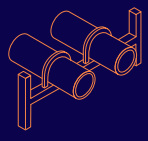


### Anchoring & Fixing

Systems for fixing secondary fixtures to concrete, including anchor channels, bolts and inserts; also tension rod systems for roofs and canopies.

### Formwork & Site Accessories

Non-structural accessories that complement our engineered solutions and help keep your construction environment operating safely and efficiently, including moulds for casting standard and special concrete elements and construction essentials such as reinforcing bar spacers.



### Industrial Technology

Mounting channels, pipe clamps and other versatile framing systems that provide safe fixing in a wide range of industrial applications.

## Leviat product ranges:

Ancon | Aschwanden | Connolly | Halfen | Helifix | Isedio | Meadow Burke | Modersohn | Moment | Plaka | Scaldex | Thermomass

## HALFEN HD SOCKET LIFTING SYSTEM
## Certified quality — Connected to safety.

**The HALFEN HD Socket Lifting System meets the requirements of European Machinery Directive (MD) 2006/42/EC. The directive defines the required steel-load-bearing properties for anchor systems used for lifting.**

In addition, the HALFEN transport anchors already meet the current EN 13155 standard; "Cranes – Safety – Non-fixed load lifting attachments".

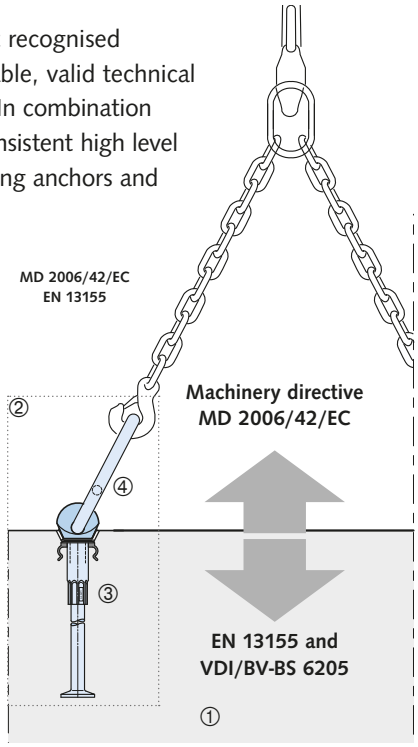
**Important changes for use in the UK:**
The UK is transitioning to its own UK based approval system and, as a result, from January 2023 will no longer accept CE marking. Leviat already has new UKCA marking in place and from 2023 at the latest, the UKCA mark will also be applied directly to the lifting devices, as required by the UKCA regulations. The conformity assessment processes and standards that can be used to demonstrate conformity under UKCA marking are aligned with those required for CE marking, so there is no difference in performance or testing requirements.

EN 13155 is the first harmonized European standard and is therefore a product standard setting out detailed requirements for specified "partly completed machinery", in this case Non-fixed load lifting attachments. The standard serves to coordinate with the Machinery Directive, and on a European technical level, now also considers the decisive composite material concrete, in precast concrete components.

Previous, as a supplement to the Machinery Directive, the German guideline VDI/BV-BS 6205 regulated the resistances of embedded anchors required for the safe use of lifting anchor systems. In the process of publishing EN 13155, the guideline was also fundamentally revised. As before, it continues to provides basics and important additional information for manufacturing, design and use of lifting anchor systems.

The VDI/BV-BS 6205 continues to represent recognised standards of technology in this field; applicable, valid technical specifications will continue to be observed. In combination with EN 13155, we therefore guarantee a consistent high level of safety when using HALFEN HD Socket lifting anchors and lifting anchor systems.

All our lifting anchor systems are CE marked. This confirms conformity with MD 2006/42/EC and EN 13155. This catalogue includes the installation and application instruction as defined in EN 13155. Our lifting anchors and lifting anchor systems are subject to a system of regular internal and external monitoring. We guarantee consistent high quality and maximum safety for you, your company and your employees.




① Precast element
② Lifting anchor system ③+④
③ Lifting anchor
④ Lifting link

### Dependability

**High ductility — High performance even in extreme situations**

Specially tempered steel guarantees extensive elastic and plastic properties. The required unique steel compositions to achieve these product characteristics are specified by us. Numerous tests and many years of experience guarantee the best possible results and maximum reliability in all applications.

**Toughness at subzero temperatures — Same material characteristics irrespective of weather conditions**

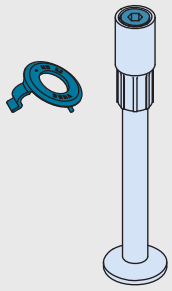
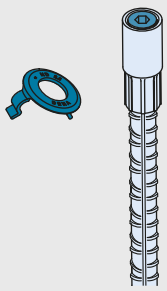
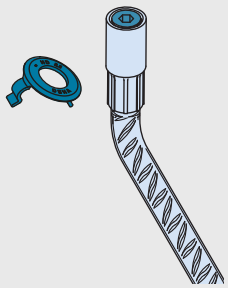
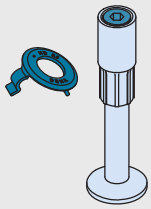
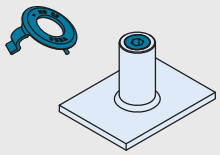
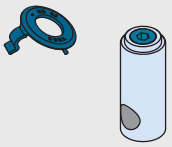
The special composition of the steel ensures constant identical characteristics (temperature independent). The steel used for our products exceeds the requirement of DIN EN 10025.

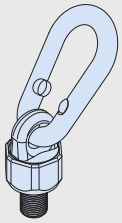
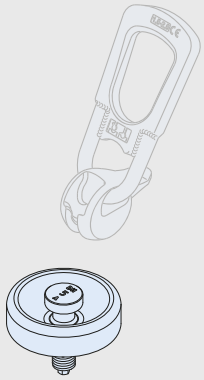
**Quality control — for reliable application**

By specifying products, materials and continual raw material and product monitoring, and testing by renown independent bodies and universities, our customers can be sure that the quality and properties of all our Anchors remain consistent.

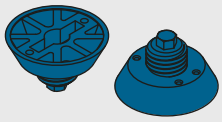
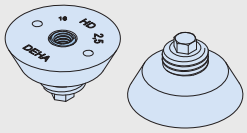
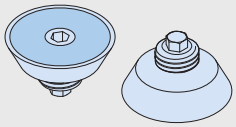
# CONTENT

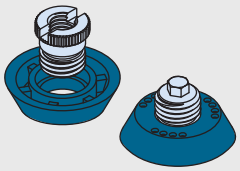
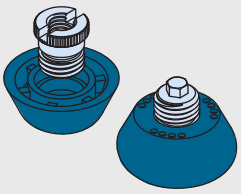
# HALFEN HD SOCKET LIFTING SYSTEM
## System Overview

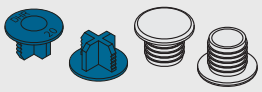
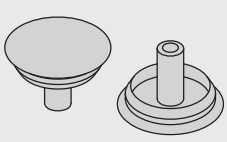
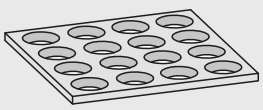
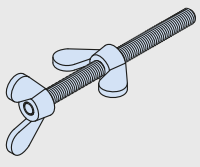
| HD Transport anchor | | | |
|---|---|---|---|
| | HD Anchor<br>6360 | HD Rod anchor<br>6361 | HD Rod anchor<br>offset |
| |  |  |  |
| Application | For lifting a wide range of different format precast concrete elements | For application in especially thin structural elements: garage walls, utility and modular structures | For application in sandwich elements; is used with a compensating beam for transporting and installation |
| Load class | 1,3 – 25,0 | 1,3 – 15,0 | 5,0 – 15,0 |
| | HD Short anchor<br>6360 | HD Plate anchor<br>6370 | HD Plain anchor with hole<br>6376 |
| |  |  |  |
| Application | For transporting slab elements; for example floor and roof slabs | For transporting large, thin precast slabs elements that are lifted perpendicular to their main surface | For lifting thin precast walls or for use with low-strength concrete. Load transmission in the concrete is with hanger reinforcement inserted through the anchor hole. |
| Load class | 1,3 – 7,5 | 1,3 – 7,5 | 1,3 – 10,0 |

| HD Lifting devices | | | | |
|---|---|---|---|---|
| | HD Lifting link<br>6362 | HD Perfect head lifting link<br>6377 | Rotary head lifting link<br>6367 | HD Adapter<br>6366 |
| |  |  |  |  |
| Application | For lifting precast elements with cast-in HD Transport anchors | For lifting precast elements with cast-in HD Transport anchors | For lifting precast elements with cast-in HD Anchors. Especially suitable for diagonal and shear loads and for tilting and pitching. | The HD Adapter allows the HD Anchor range to be used with the HALFEN DEHA Universal head lifting link (spherical head anchor system). |
| Load class | 1,3 – 15,0 | 1,3 – 15,0 | 1,3 – 25,0 | 1,3 – 15,0 |

# HALFEN HD SOCKET LIFTING SYSTEM
## System Overview

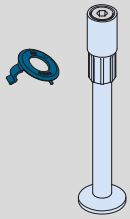
| HD Anchor accessories | | | |
|---|---|---|---|
| | HD Nailing plate, plastic | HD Nailing plate, steel | HD Nailing plate, steel core + magnet |
| | 6358  | 6369  | 6365  |
| Material | Plastic | Steel | Steel |
| Application | To secure the HD Anchor to formwork: when using the HD link (6362), the rotary head link (6367), the HD Perfect head (6377) and the adapter (6366) for the Universal head clutch (6102) | | |
| Thread sizes M/Rd | 12 – 52 | | |

| | Combi nailing plate, steel core+replacement ring | Combi nailing plate, steel core+replacement ring | HD Identification cap |
|---|---|---|---|
| | 6510  | 6520  | 6363  |
| Material | Ring: plastic, Thread: steel | Ring: plastic, Thread: steel | Plastic |
| Application | To secure the HD Anchor to formwork when using the HD link (6362), the rotary head link (6367), the HD Perfect head (6377) and the adapter (6366) for the Universal head clutch (6102) | To secure the HD Anchor to formwork when using the HD lifting link (6362), the rotary head link (6367) and the HD Perfect head (6377) | The identification cap provides information on the installed HD Anchor. The clip can also be used to secure potentially required reinforcement. |
| Thread sizes M/Rd | 12 – 64 | 12 – 52 | load class 1,3 – 15,0 |

| | Sealing caps | Sealing cap | Rubber mould | Retaining bolt S1 |
|---|---|---|---|---|
| | 6359 6315  | 6513  | 6329  | TPA-S1  |
| Material | Plastic | Plastic | Rubber | Steel |
| Application | Used to seal and protect threads against dirt and other impurities | Used to seal and protect the anchor against dirt and other impurities. Especially for decorative concrete. Suitable for: (6358), (6369), (6365), (6510) | Mould for making 10 mm thick concrete recess caps | Used to secure the steel nailing plate to the formwork |
| Thread sizes M/Rd | 12 – 52 | 12 – 24 | all load classes | 8, 12, 16 |

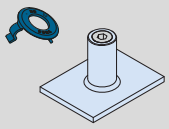
# HALFEN HD SOCKET LIFTING SYSTEM
## Product Range HD Anchors

### HD Anchor



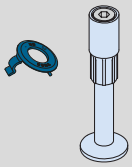
| Load class | | Article name | Order no. 0740.130- |
|---|---|---|---|
| Socket zinc-plated | 1,3 | 6360-1,3-130 | 00001 |
| | 2,5 | 6360-2,5-140 | 00040 |
| | 2,5 | 6360-2,5-200 | 00002 |
| | 4,0 | 6360-4,0-258 | 00003 |
| | 5,0 | 6360-5,0-325 | 00004 |
| | 7,5 | 6360-7,5-400 | 00005 |
| | 10,0 | 6360-10,0-475 | 00006 |
| | 12,5 | 6360-12,5-550 | 00007 |
| | 15,0 | 6360-15,0-575 | 00008 |
| | 25,0 | 6360-25,0-630 | 00041 |
| Socket stainless steel A4 | 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 Plate anchor



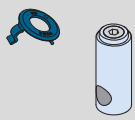
| Load class | | Article name | Order no. 0740.180- |
|---|---|---|---|
| Zinc-plated | 1,3 | 6370-1,3 | 00001 |
| | 2,5 | 6370-2,5 | 00002 |
| | 4,0 | 6370-4,0 | 00003 |
| | 5,0 | 6370-5,0 | 00004 |
| | 7,5 | 6370-7,5 | 00005 |
| Stainless steel A4 | 1,3 | 6370-1,3 A4 | 00006 |
| | 2,5 | 6370-2,5 A4 | 00007 |
| | 4,0 | 6370-4,0 A4 | 00008 |
| | 5,0 | 6370-5,0 A4 | 00009 |
| | 7,5 | 6370-7,5 A4 | 00010 |

### HD Short anchor



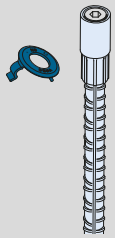
| Load class | | Article name | Order no. 0740.130- |
|---|---|---|---|
| Socket zinc-plated | 1,3 | 6360-1,3-070 | 00017 |
| | 2,5 | 6360-2,5-090 | 00018 |
| | 4,0 | 6360-4,0-125 | 00019 |
| | 5,0 | 6360-5,0-140 | 00020 |
| | 7,5 | 6360-7,5-185 | 00038 |
| Socket stainless steel A4 | 1,3 | 6360-1,3-070 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 Plain anchor



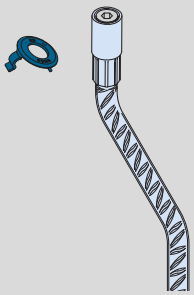
| Load class | | Article name | Order no. 0740.190- |
|---|---|---|---|
| Zinc-plated | 1,3 | 6376-1,3 | 00001 |
| | 2,5 | 6376-2,5 | 00002 |
| | 4,0 | 6376-4,0 | 00003 |
| | 5,0 | 6376-5,0 | 00004 |
| | 7,5 | 6376-7,5 | 00005 |
| | 10,0 | 6376-10,0 | 00006 |
| Socket stainless steel A4 | 1,3 | 6376-1,3 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 Rod anchor



| Load class | | Article name | Order no. 0740.140- |
|---|---|---|---|
| Socket zinc-plated | 1,3 | 6361-1,3-300 | 00001 |
| | 2,5 | 6361-2,5-400 | 00002 |
| | 4,0 | 6361-4,0-520 | 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 |
| Socket stainless steel A4 | 1,3 | 6361-1,3-300 A4 | 00009 |
| | 2,5 | 6361-2,5-400 A4 | 00010 |
| | 4,0 | 6361-4,0-520 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 |

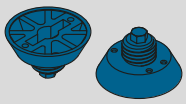
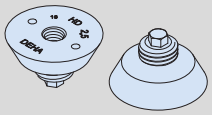
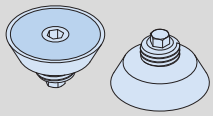
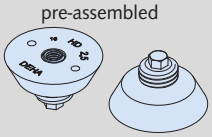
### HD Rod anchor, offset



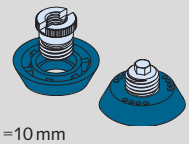
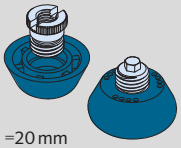
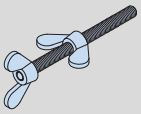
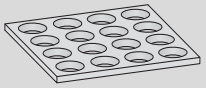
| Load class | | Article name | Order no, 0740,220- |
|---|---|---|---|
| Socket zinc-plated | 5,0 | 6361G-5,0-540 | 00001 |
| | 7,5 | 6361G-7,5-700 | 00002 |
| | 10,0 | 6361G-10,0-800 | 00003 |
| | 12,5 | 6361G-12,5-920 | 00004 |
| | 15,0 | 6361G-15,0-1100 | 00005 |

# HALFEN HD SOCKET LIFTING SYSTEM
## Product Range Accessories

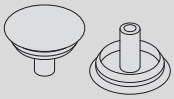
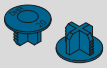
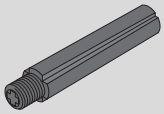
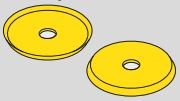
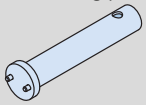
**HD Anchor accessories**

| Load class | Plastic nailing plate | | Identification cap, plastic | | HD Nailing plate, steel | | HD Nailing plate, magnetic | | HD Nailing plate, steel with thread-reduction, pre-assembled | |
|---|---|---|---|---|---|---|---|---|---|---|
| |  | |  | |  | |  | |  | |
| | Article name | Order no. 0741.040- | Article name | Order no. 0741.170- | Article name | Order no. 0741.190- | Article name | Order no. 0741.180- | Article name | Order no. 0741.190- |
| 1,3 | 6358-12 | 00001 | 6363-12 | 00001 | 6369-12 | 00001 | 6365-12 | 00001 | - | - |
| 2,5 | 6358-16 | 00003 | 6363-16 | 00002 | 6369-16 | 00002 | 6365-16 | 00002 | 6369-16 | 00102 |
| 4,0 | 6358-20 | 00005 | 6363-20 | 00003 | 6369-20 | 00003 | 6365-20 | 00003 | 6369-20 | 00103 |
| 5,0 | 6358-24 | 00006 | 6363-24 | 00004 | 6369-24 | 00004 | 6365-24 | 00004 | 6369-24 | 00104 |
| 7,5 | 6358-30 | 00007 | 6363-30 | 00005 | 6369-30 | 00005 | 6365-30 | 00005 | 6369-30 | 00105 |
| 10,0 | 6358-36 | 00008 | 6363-36 | 00006 | 6369-36 | 00006 | 6365-36 | 00006 | - | - |
| 12,5 | 6358-42 | 00009 | 6363-42 | 00007 | 6369-42 | 00007 | 6365-42 | 00007 | - | - |
| 15,0 | 6358-52 | 00010 | 6363-52 | 00008 | 6369-52 | 00008 | 6365-52 | 00008 | - | - |

**HD Anchor accessories**

| Load class | Nailing plate, steel core | | Replacement ring for 6510 | | Nailing plate, steel core | | Replacement ring for 6520 | | Retaining bolt | | Mould for recess fillers | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| |  h =10 mm | |  h =10 mm | |  h =20 mm | |  h =20 mm | |  | |  | |
| | Article name | Order no. 0741.080- | Article name | Order no. 0741.090- | Article name | Order no. 0741.210- | Article name | Order no. 0741.230- | Article name | Order no. 0073.060- | Article name | Order no. 0741.290- |
| 1,3 | 6510-12 | 00101 | 6512-12 | 00001 | 6520-12 | 00101 | 6522-12 | 00001 | S1-08 | 00001 | 6329-12-16 | 00001 |
| 2,5 | 6510-16 | 00103 | 6512-16 | 00003 | 6520-16 | 00103 | 6522-16 | 00003 | S1-12 | 00002 | | |
| 4,0 | 6510-20 | 00105 | 6512-20 | 00005 | 6520-20 | 00105 | 6522-22 | 00005 | | | 6329-18-24 | 00002 |
| 5,0 | 6510-24 | 00106 | 6512-24 | 00006 | 6520-24 | 00106 | 6522-24 | 00006 | | | | |
| 7,5 | 6510-30 | 00107 | 6512-30 | 00007 | 6520-30 | 00107 | 6522-30 | 00007 | | | 6329-30-36 | 00003 |
| 10,0 | 6510-36 | 00108 | 6512-36 | 00008 | 6520-36 | 00108 | 6522-36 | 00008 | | | | |
| 12,5 | 6510-42 | 00109 | 6512-42 | 00009 | 6520-42 | 00109 | 6522-42 | 00009 | S1-16 | 00003 | 6329-42-52 | 00004 |
| 15,0 | 6510-52 | 00110 | 6512-52 | 00010 | 6520-52 | 00110 | 6522-52 | 00010 | | | | |
| 25,0 | 6510-64 | 00111 | 6512-64 | 00011 | - | - | - | - | - | - | - | - |

**HD Anchor accessories**

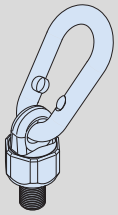
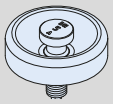
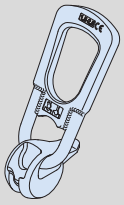
| Load class | Sealing cap | | Sealing cap* | | Sealing cap | | HD Assembly pin | | Flat seal, rubber (yellow) | | Tool for steel nailing plate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| |  | |  | |  | |  | |  | |  | |
| | Article name | Order no. 0741.280- | Article name | Order no. 0741.120- | Article name | Order no. 0741.130 | Article name | Order no. 0741.300- | Article name | Order no. 0741.330- | Article name | Order no. 0741.350- |
| 1,3 | 6313-12 | 00001 | 6359-12 | 00001 | 6315-12 | 00001 | 6330-Rd 12-30 | 00001 | 6334-Rd 12-16 | 00001 | 6337-Rd 12-16 | 00001 |
| 2,5 | 6313-16 | 00002 | 6359-16 | 00003 | 6315-16 | 00003 | | | | | | |
| 4,0 | 6313-20 | 00003 | 6359-20 | 00005 | 6315-20 | 00005 | | | 6334-Rd 20-24 | 00002 | 6337-Rd 20-52 | 00002 |
| 5,0 | 6313-24 | 00004 | 6359-24 | 00006 | 6315-24 | 00006 | | | | | | |
| 7,5 | - | - | 6359-30 | 00007 | 6315-30 | 00007 | | | 6334-Rd 30-36 | 00003 | | |
| 10,0 | - | - | 6359-36 | 00008 | 6315-36 | 00008 | - | - | | | | |
| 12,5 | - | - | 6359-42 | 00009 | 6315-42 | 00009 | - | - | - | - | | |
| 15,0 | - | - | 6359-52 | 00010 | 6315-52 | 00010 | - | - | | | | |

*see also page 7; for more detailed information refer to the Technical Product Information "HALFEN HA Socket Lifting System"

## HALFEN HD SOCKET LIFTING SYSTEM

# Product Range HD Lifting Links and Clutches/ Application Notes

**Lifting links**

| Load class | HD Link | | HD Perfect head | | HD Rotary head link | | HD Adapter | | Universal head clutch | |
|---|---|---|---|---|---|---|---|---|---|---|
| |  | |  | |  | |  | |  | |
| | Article name | Order no. 0742.130- | Article name | Order no. 0742.170- | Article name | Order no. 0742.230- | Article name | Order no. 0742.140- | Article name | Order no. 0738.010- |
| 1,3 | 6362-12 | 00001 | 6377-12 | 00001 | 6367-12 | 00001 | 6366-12 | 00001 | 6102-1,0/1,3 | 00001 |
| 2,5 | 6362-16 | 00002 | 6377-16 | 00002 | 6367-16 | 00002 | 6366-16 | 00002 | 6102-1,5/2,5 | 00002 |
| 4,0 | 6362-20 | 00003 | 6377-20 | 00003 | 6367-20 | 00003 | 6366-20 | 00003 | 6102-3,0/5,0 | 00003 |
| 5,0 | 6362-24 | 00004 | 6377-24 | 00004 | 6367-24 | 00004 | 6366-24 | 00004 | | |
| 7,5 | 6362-30 | 00005 | 6377-30 | 00005 | 6367-30 | 00005 | 6366-30 | 00005 | 6102-6/10 | 00004 |
| 10,0 | 6362-36 | 00006 | 6377-36 | 00006 | 6367-36 | 00006 | 6366-36 | 00006 | | |
| 12,5 | 6362-42 | 00007 | 6377-42 | 00007 | 6367-42 | 00007 | 6366-42 | 00007 | 6102-12/20 | 00005 |
| 15,0 | 6362-52 | 00008 | 6377-52 | 00008 | 6367-52 | 00008 | 6366-52 | 00008 | | |
| 25,0 | - | - | - | - | 6367-64 | 00009 | - | - | - | - |

## Preparation and installing to the formwork

① Fix the nailing plate to the formwork (the steel nailing plate is held in place with a retaining bolt).

② Press the identification cap on to the sleeve. The sleeve protection is in place on delivery.

③ Turn the identification cap to the required position (depends on the position of subsequent reinforcement).

**Steel nailing plates:** The sleeve protection cap is turned inwards while screwing the assembly onto the steel nailing plate (see cut-away below).

④ The HD Anchor can now be screwed to the nailing plate (see cut-away detail below).

**Steel nailing plate:** Use a retaining screw to fix the HD Anchor and the nailing plate to the formwork.

## Colour codes; load classes

| Colour | Load class | Thread M/Rd |
|---|---|---|
| red | 1,3 | 12 |
| light grey | 2,5 | 16 |
| green | 4,0 | 20 |
| blue | 5,0 | 24 |
| violet | 7,5 | 30 |
| orange | 10,0 | 36 |
| brown | 12,5 | 42 |
| black | 15,0 | 52 |
| green | 25,0 | 64 |

⚠ The listed load classes only apply for the HD Transport anchor system. The colour codes for the HALFEN DEHA HA Socket anchor system can be found in the technical product information "HALFEN DEHA HA Socket anchors".

# HALFEN HD SOCKET LIFTING SYSTEM
## Installation and Application

### Safety regulations

The transport anchor system consists of the permanently cast-in transport anchor and the temporarily connected lifting equipment.

The basic principles for dimensioning and application of transport anchors can be found in the EN 13155.

The regulations require the following safety factors:

| Safety against failure | |
|---|---|
| Steel failure of anchors: | $\gamma = 3.0$ |
| Concrete failure*: | $\gamma = 2.5$ |
| Breakage of lifting link: | $\gamma = 4.0$ |

* A safety factor of $\gamma = 2.3$ can be assumed for transport anchors installed in a continuous supervised factory environment.

⚠ For safety reasons, the installation and application instructions for the HALFEN Lifting systems must always be available at the place of use.

The installation and application instructions must be kept readily available in the precast plant and on the construction site. The plant or site manager must ensure that the operator has read and understood the installation and application instructions for this system.

### Quality control

All transport anchors and systems are quality controlled in accordance with DIN EN ISO 9001.

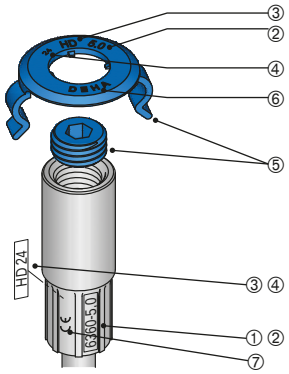
### Identification

All HALFEN Lifting and hoisting equipment are clearly and visibly marked. According to EN 13155, identification marking of all lifting elements must remain clearly visible, even after installation.

**Identification**

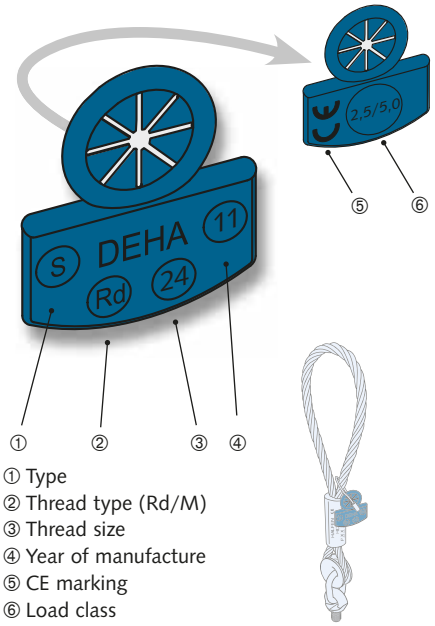
...on the identification cap

...on the sleeve




① Article name, example: 6360
② Load class, example: 5,0
③ HD = anchor type
④ Thread Rd, example: 24
⑤ Colour code for load class, example: blue for 5,0
⑥ Manufacturer mark
⑦ CE marking

...on the load label on the clutch




① Type
② Thread type (Rd/M)
③ Thread size
④ Year of manufacture
⑤ CE marking
⑥ Load class

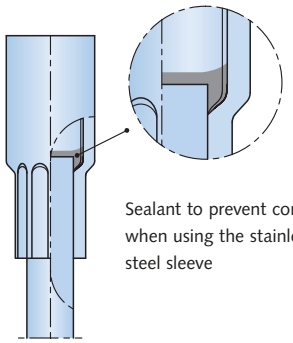
### Stainless steel transport anchor

Repeated use of a transport anchor is not permitted. Multiple lifting within one transport-chain from production to final installation of an element is not regarded as repeated use and is therefore allowed.

Transport anchors for permanent use in crane ballast etc. must be made of stainless steel in accordance with the approval regulation for stainless steel; approval no. Z-30.3-6.

If the anchors are regularly exposed to frost and de-icing salt then the shaft must also be ordered in stainless steel.

### Corrosion protection



Sealant to prevent corrosion when using the stainless steel sleeve

### Damaged anchors

Incorrectly cast or damaged transport anchors, for example damage caused by corrosion, visible deformation etc. must not be used for lifting.

# HALFEN HD SOCKET LIFTING SYSTEM
## Installation and Application

### Criteria for anchor selection

Maximum load capacities, edge distances and installation values can be found in the respective tables. Irrespective of the selected anchor type (selected according to the load acting on the anchor) the following factors must be taken into account for calculation:

- weight of the precast element
- number of anchors
- anchor layout
- number of load-bearing anchors
- spread angle in the hoist
- anchor diagonal load properties
- dynamic loads
- adhesion to the formwork

Ensure sufficient pitching reinforcement if slabs are cast in the horizontal and subsequently lifted upright without a tilting-table.

### Number of anchors

The number of anchors determines the type of hoist that needs to be used. A hoist with more than two cables is statically indeterminate if the anchors are aligned along a single axis. Hoists with more than three cables are deemed statically indeterminate if measures are not taken to ensure the load is distributed amongst all anchors (for example: with a spreader beam).

### Installation and application

The HD Transport anchor system should only be installed when the following technical specifications and requirements have been met:

- load capacity
- edge distance
- concrete grade strength
- load direction
- additional reinforcement

### Load capacity

The load capacity of the anchor depends on:

- concrete compression strength $f_{ci}$ at time of lift (cube-test 15 × 15 × 15 cm)
- anchorage length of the anchor
- edge and axial anchor-spacing
- load direction
- reinforcement layout

### Load directions

Definition of load directions:

**Axial load**
The lifting link acts in the longitudinal direction of the cast-in lifting anchor

**Diagonal load**
The lifting link acts at an angle to the longitudinal direction directly in the element

**Shear load**
The lifting link acts perpendicular to the cast-in lifting anchor

### Calculating the tension load

As a rule the tension-force Z in the anchor is calculated using the following formulae:

**Load case; removing the formwork**

$F_Z = F_G \times z \times \xi / n$

or

$F_Z = (F_G + q_{adh} \times A_f) \times z / n$

**Load case; transport**

$F_Z = F_G \times z \times \psi_{dyn} / n$

**Abbreviations:**

$F_Z$ = tension force on the anchor [kN]

$F_G$ = element weight [kN] (according to DIN 1055-1 (06/2002) specific weight of $\gamma = 25$ kN/m$^3$)

$A_f$ = contact surface between the concrete and formwork [m$^2$]

n = number of load-bearing anchors

z = spread angle factor

$\xi$ = formwork adhesion factor

$\psi_{dyn}$ = dynamic factor

$q_{adh}$ = base value for formwork adhesion

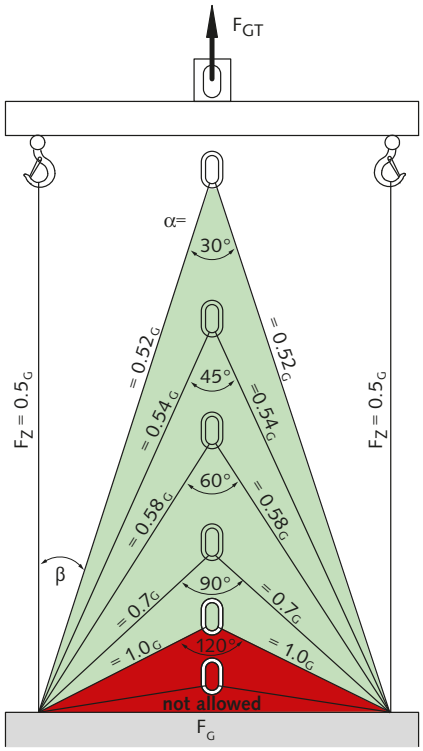
$F_{adh}$ = effective load caused by formwork adhesion [kN]

## Load on the anchor – dead-weight

**Dead-weight of the element:** Volume × specific weight of the concrete

**Increase factors:**

### Spread angle




■ This spread angle is not permitted for cable spread!

| Spread angle factor | | |
|---|---|---|
| Cable angle<br>β | Spread angle<br>α | Factor<br>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 |

### Dynamic loads

The effect of dynamic loading depends mainly on the lifting equipment between the crane and the load lifting head.

**Cables made of steel or synthetic fibre** have a damping effect. With increasing cable length the damping effect is increased.

**Short chains** have an unfavourable effect. The forces acting on the lifting anchor are calculated taking the dynamic factor $\psi_{dyn}$ into account.

| Dynamic-factors $\psi_{dyn}$* | |
|---|---|
| Lifting situation | Factors $\psi_{dyn}$* |
| Stationary crane<br>Swing-boom crane<br>Rail crane | 1.3 |
| Lifting and moving on **level** terrain | 2.5 |
| Lifting and moving on **uneven** terrain | ≥ 4.0 |

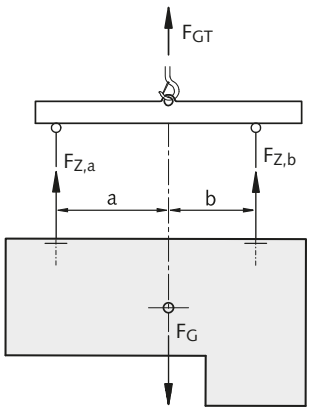
* If other values from reliable tests or through proven experience are available for $\psi_{dyn}$, then these may be used for calculation.

For other transport and lifting situations the coefficient $\psi_{dyn}$ is defined through reliable tests or proven experience.

### Non-symmetrical anchor layout

The load in each anchor is calculated using bar statics if the anchors are not installed symmetrically to the centre of gravity.

Uneven loading of the anchor caused by non-symmetrical installed anchors in respect to the load's centre of gravity:




The centre of gravity of the load will always stabilise verticality under the crane hook. Load distribution in non-symmetrical installed anchors when using a spreader beam is calculated as follows:

$$F_{Z,a} = F_G \times b / ( a + b )$$

$$F_{Z,b} = F_G \times a / ( a + b )$$

## Loads on the anchor – formwork adhesion

**Adhesion:**

### › Adhesion forces

Depending on the material used for the formwork the adhesion between the formwork and concrete can vary.

The following table can be used as a reference:

| Adhesion to the formwork | |
|---|---|
| Lubricated steel formwork | $q_{adh} \geq 1$ kN/m² |
| Varnished timber formwork | $q_{adh} \geq 2$ kN/m² |
| Untreated formwork | $q_{adh} \geq 3$ kN/m² |

The adhesion value ($F_{adh}$) for the formwork is calculated with the following equation:

$$F_{adh} = q_{adh} \times A_f \text{ ①}$$

① Surface of the cast slab attached to the formwork before lifting.

### › Increased adhesion

Increased adhesion must be assumed for π-panel and coffered ceilings slabs.

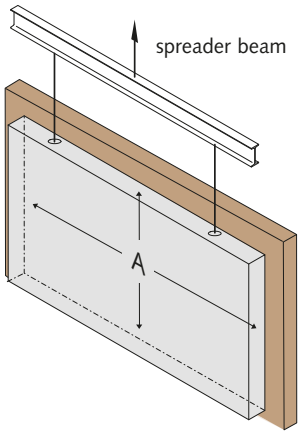
A multiple of the dead weight is used to simplify calculation.

| Increased adhesion to the formwork | |
|---|---|
| π - panel | ξ = 2 |
| Ribbed panel | ξ = 3 |
| Waffled panel | ξ = 4 |

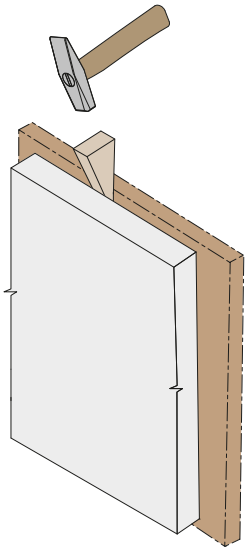
Substantial load increase can also be encountered when components are lifted parallel or near parallel to parts of the formwork. This applies to ribbed slabs and coffered ceiling slabs and can also apply to vertically cast columns and slabs.

### › Striking the formwork

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




Use a wedge to carefully prise difficult to remove formwork from hardened concrete.

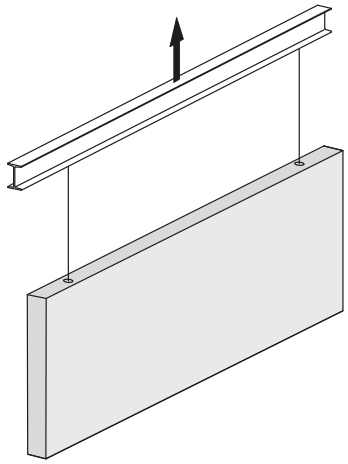


**Note:** To avoid precast elements hanging at a slant when being moved the hook in the spreader beam should be directly above the centre of gravity. If lifting elements without a spreader beam then the transport anchors should be installed symmetrically to the centre of gravity.

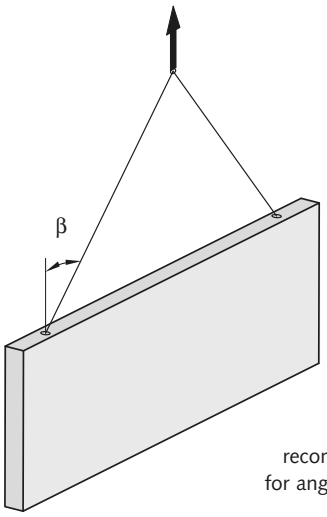
# HALFEN HD SOCKET LIFTING SYSTEM
## Design Considerations

### Tensile loads at the anchors

**Axial load β: 0° to 10°**

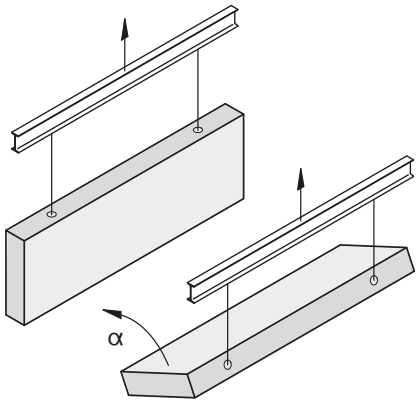


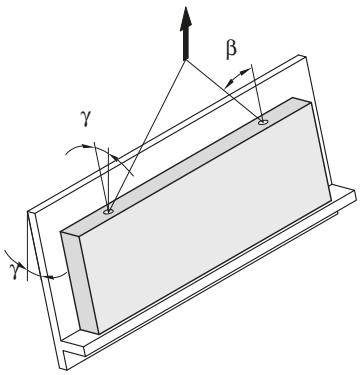
**Diagonal load β: 10° to 60° ①**




① Not recommended for angles > 45°

**Tilting α: 90°**

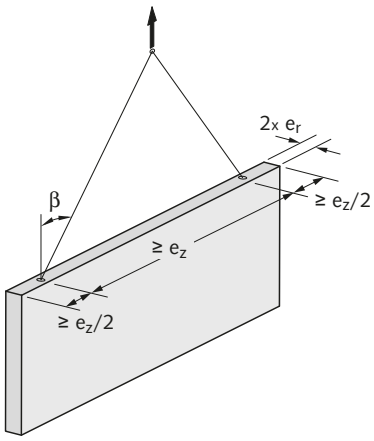


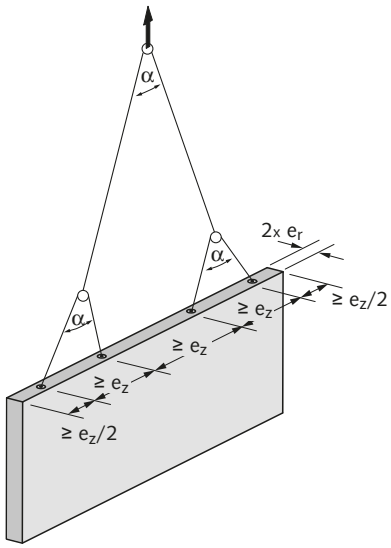

The shear reinforcement can be omitted when using a tilting table and a load angle of γ < 15°.

### Static systems

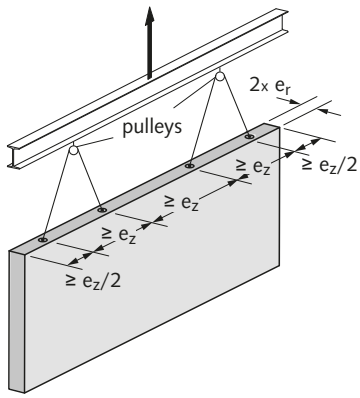
**Positioning of anchors in walls**




Assumed number of load-bearing anchors: n = 2




Assumed number of load-bearing anchors: n = 4




Assumed number of load-bearing anchors: n = 4

## Calculation — Static systems

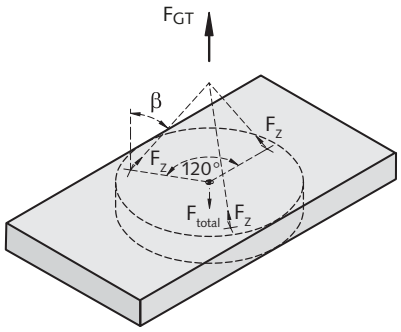
### Anchor layout in slabs

In general, a beam with more than two suspension points or a panel with more than three suspension points is classed as a statically indeterminate system; even if the anchors are arranged symmetrically to the load centre. Because of unavoidable tolerances in suspension systems and in the position of anchors, it should never be assumed that a load is distributed equally among all anchors.

Using tolerance-compensating suspension systems allow exact load distribution (e.g. articulated lifting beam combinations, multiple slings with compensating rig, etc.). This type of system should only be used by experienced personnel; also bear in mind that this system must be used both in the precast factory and on site. If in doubt assume only two anchors are load-bearing (BGR 500 Ch. 2.8 Point 3.5.3). The use of two anchors is recommended for beams and upright panels installed symmetrically to the load centre. In both instances, it can be assumed that the two anchors will be subjected to equal loads.

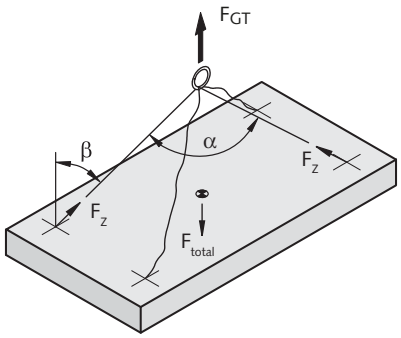
### Examples

Using three anchors ensure a static determinate system.



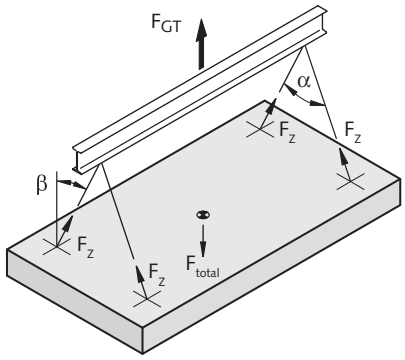

Assumed number of load-bearing anchors: n = 3

With four independent cable runs or two single diagonal cables, only two anchors can be assumed to be load-bearing.



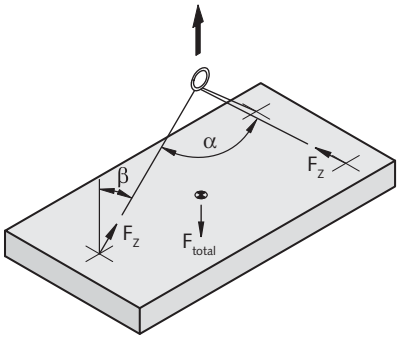

Assumed number of load-bearing anchors: n = 2

A perfect static weight distribution is achieved by using a spreader-beam and two symmetrical pairs of anchors.



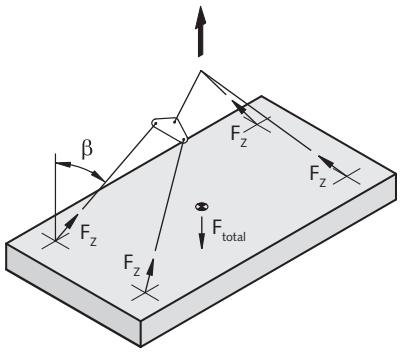

Assumed number of load-bearing anchors: n = 4

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



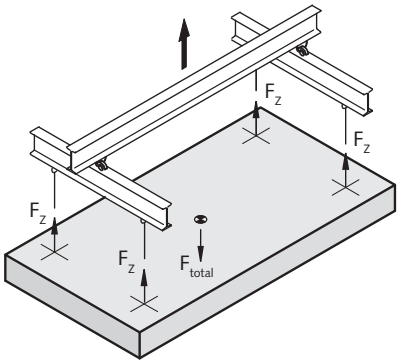

Assumed number of load-bearing anchors: n = 2

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




Assumed number of load-bearing anchors: n = 4

A perfect static weight distribution can be achieved using a spreader-beam which avoids diagonal load.




Assumed number of load-bearing anchors: n = 4

**Reinforcement recommendations**
To ensure correct load distribution and to prevent concrete failure different types of additional reinforcement must be installed. This reinforcement is not scope of delivery and must be supplied in the precast plant.

**Standard reinforcement**
Generally the main reinforcement consists of mesh reinforcement installed close to the surface on both sides of the slab. Optionally, a single layer of reinforcement can be installed centrically in slabs ≤ 80 mm thick.

**Edge reinforcement**
Edge reinforcement is normally present in the slabs. Edge reinforcement is only required for the HD Anchor load capacities in higher load classes (→ see also details on reinforcement in the tables on pages 24–34).

**Diagonal load reinforcement**
No reinforcement for diagonal load is required for up to 10° axial load in all directions.

The diagonal reinforcement can be omitted with diagonal loads between 10° and 30° and increased element thickness (edge spacing ≥ e1).

Diagonal load reinforcement is always required for diagonal loads between 30° and 45°.

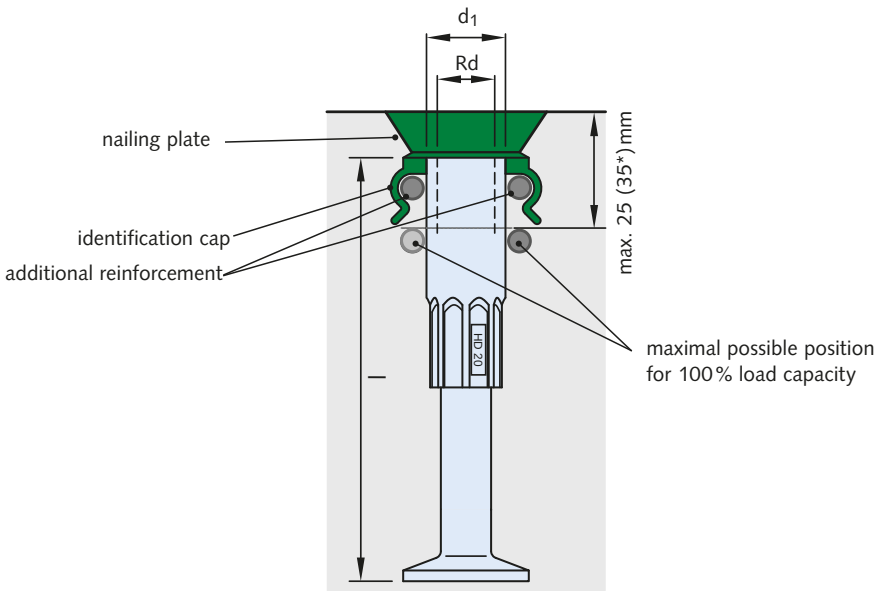
The diagonal reinforcement can be replaced with transverse reinforcement positioned on both sides of the anchor.

The reinforcement needs to be placed as close as possible to the top of the socket to achieve the load capacities listed in the tables.

Load capacity for diagonal loads is substantially reduced for anchors if the additional reinforcement is installed too deep in the concrete.

**Transverse stress reinforcement**
Transverse reinforcement is required on both sides of the anchor when lifting slabs upright, removing slabs from tilting tables at angles < 80° or if transported slanted at angles less than 70°.

Single side transverse reinforcement can be installed to ensure transverse loads only act to the one side.

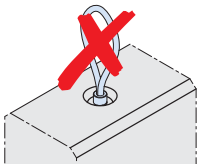



*applies for 20 mm nailing plate

# HALFEN HD SOCKET LIFTING SYSTEM
## Installation and Application

### Using Lifting links

Only use the HD Lifting link and the HD Perfect head lifting link for lifting. For safety reasons using other lifting equipment, for example cable-loops is not permitted.

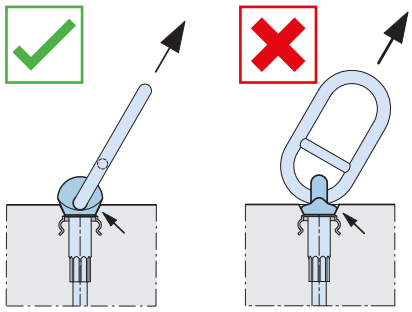


**Labelling**
The HD Lifting links are marked with the product name identification, the type of link, the year of manufacture, the thread size and the load range.

**Application**
The HD Lifting link is a manually-operated connection.

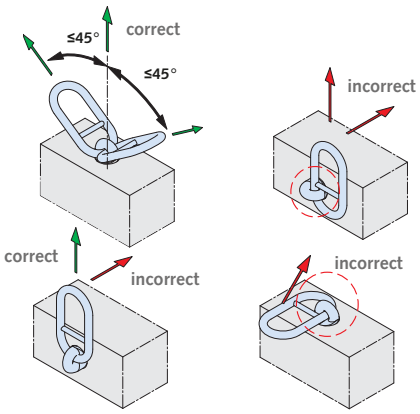
All applicable accident prevention and health and safety regulations must be observed.

Optimum load distribution is only possible if the direction of load is as shown below. If required, the HD Lifting link can be loosened by a maximum of 90° after being fully tightened.



The recess in the concrete made by the nailing plate matches the shape of the HD Lifting links exactly. This allows the lifting link to rest against the concrete when the anchor is subjected to diagonal or shear loads.

The following illustrations show correct and incorrect usage.

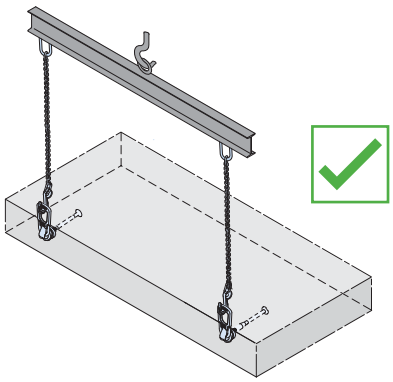


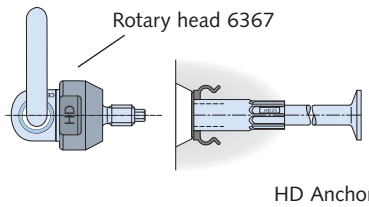

**Maintenance**
The contractor is responsible for ensuring that suitably trained personnel check the HD Lifting links before each application and that any damage found is repaired.

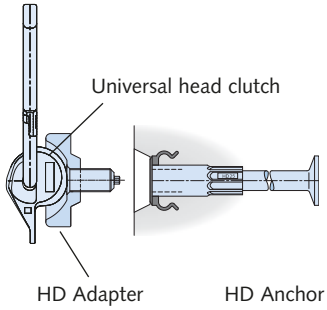
The contractor is also responsible for ensuring that the HD Lifting links are checked by an expert at least once a year. Using damaged HD Lifting links is very dangerous and is not permitted.

### General information – pitching with HD Anchors

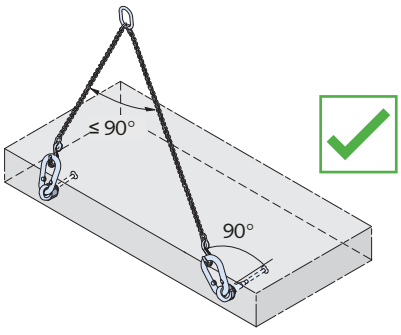
Always use a spreader beam when using the HD Lifting link 6362 or HD Perfect head 6377 to pitch a concrete panel. Pitching under diagonal load with HD Anchors and HD Lifting links 6362 or 6377 is not permitted.





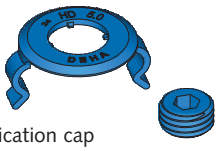

Alternatively, if a spreader beam is not available it is possible to use the rotary head lifting link 6367 or the HD Adapter no. 6366 in combination with the universal head link no. 6102.



# HALFEN HD SOCKET LIFTING SYSTEM
## Installation and Application

### Installation of the HD Lifting System

HD Anchors are delivered ready for use with a colour coded thread protector ready inserted. The HD Lifting link and the HD Anchors make up the HD Lifting system.



identification cap

thread protector

**Fig. 1:** Nailing plates are either nailed to the formwork or screwed in place using HALFEN Assembly pins through a hole in the formwork (see page 21). The HD Magnetic plate is recommended for use in steel formwork.

**We recommend coating the nailing plate with formwork lubricant.**

**Fig. 2**: Before installing the HD Anchor, the identification cap must be placed on the thread on the nailing plate. The HD Anchor with the inserted thread protection plug is then placed over the hexagonal stud of the nailing plate.

**Fig. 3:** By turning the HD Anchor the thread protection plug is simultaneously screwed down into the threaded socket. There should be no air gap between the nailing plate and the anchor socket. The identification cap which is now clamped between the anchor and the nailing plate must be rotated to the correct position (the position depends on the diagonal load reinforcement).

**Fig. 4:** After the concrete has hardened the nailing plate needs to be removed. To protect the thread ensure the thread protection plug has rotated back to the top of the socket.

| Colour code / identification cap | | |
|---|---|---|
| Load class | | Colour |
| | 1,3 | red |
| | 2,5 | light grey |
| | 4,0 | green |
| | 5,0 | blue |
| | 7,5 | violet |
| | 10,0 | orange |
| | 12,5 | brown |
| | 15,0 | black |
| | 25,0 | green |

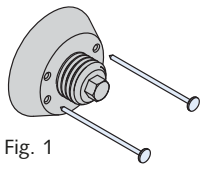


Fig. 1

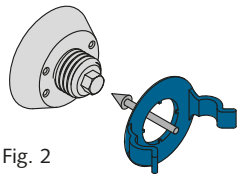


Fig. 2

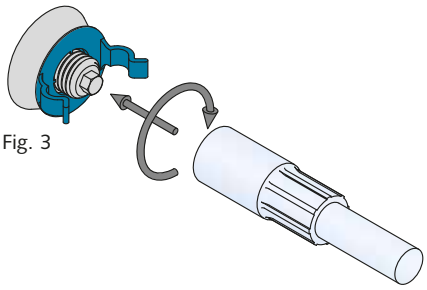


Fig. 3

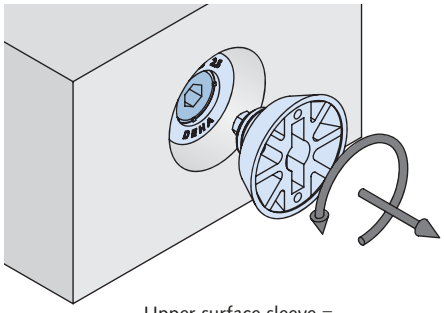
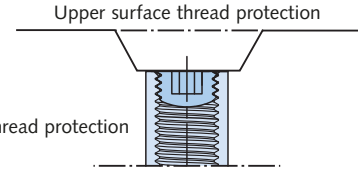
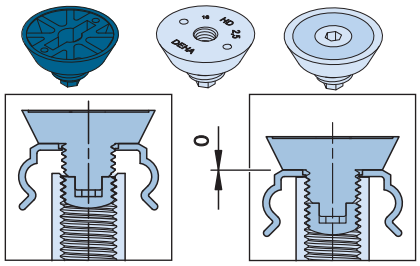


Fig. 4




Nailing plates are used to fix the HD Anchors to the formwork. The nailing plates are colour coded according to the load class and are available in plastic or steel for load class 1,3 to 15,0.

⚠ Identification caps and thread protectors are not available for load class 25,0. Identification here is visible when cast in the concrete. The nailing plate article no. 6510 can be used for this load class.




⚠ Identification caps are packed separately. These must be fitted to the appropriate HD Anchor which has the same identification colour. The integrated thread protection remains in the HD Anchor permanently (Fig. 4).

The anchors must be adequately fastened to the reinforcement to prevent them moving during concreting. Using formwork wax on the nailing plate makes them easier to remove.

We recommend filling up the hexagonal recess of the thread protection plug with formwork wax or lubricant after each use, particularly during winter. This prevents water getting into the hexagonal recess, which may freeze and block the connection between the thread of the lifting link and the socket protection system.

It is recommended to fill the entire nailing plate recess with formwork wax. This will make it easier to remove any ice which may form.

## Installing the HD Anchor using the assembly pin and steel nailing plate

Assembly pins are used in staircase formwork where protruding screws or bolts may present a hazard and are therefore not suitable. The assembly pin provides a safe and easy connection of HD Anchors to the formwork. Assembly pins can be used with nailing plates for load classes from 1,3 to 7,5.

**Fig. 5:** The assembly pin is screwed in the steel nailing plate; then the sealing plate is placed over the assembly pin.

⚠ The same assembly pin is used for all applications.

The inner thread of M10 and M12 nailing plates are reduced with a pre-fitted thread reducer. See notes on top right of page 9 for information on how to order nailing plates with pre-fitted thread reducers.

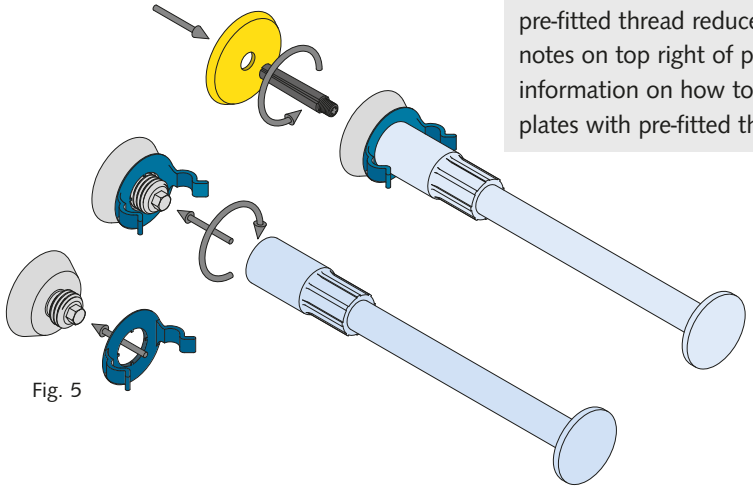


Fig. 5

**Fig. 6:** The assembly pin is first screwed into the HD Anchor with the sealing plate held in place by the pin and then pressed through a pre-drilled 8 mm diameter hole in the formwork. The assembly pin can be used in both timber and steel formwork.

**We recommend using the assembly pin only with self compacting concrete.**

⚠ The seal between the steel nailing plate and the formwork prevents concrete from seeping into and blocking the holes in the nailing plate.

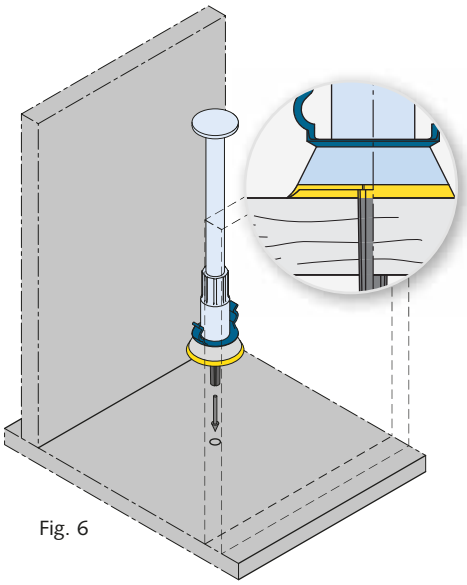


Fig. 6

⚠ The thread of the assembly pin breaks off in the nailing plate and can be removed later.

**Fig. 7:** For simple removal of the formwork the assembly pin has a design break-off point. This leaves the end of the pin in the steel nailing plate when striking the formwork. The pin end can be removed with a Phillips screwdriver; the steel nailing plate is reusable.

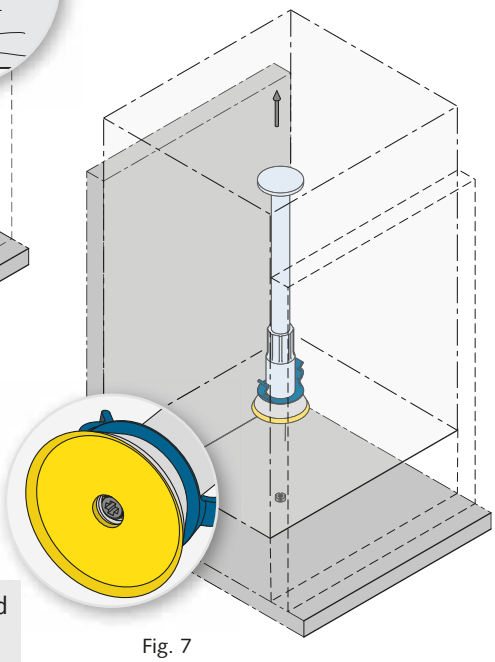
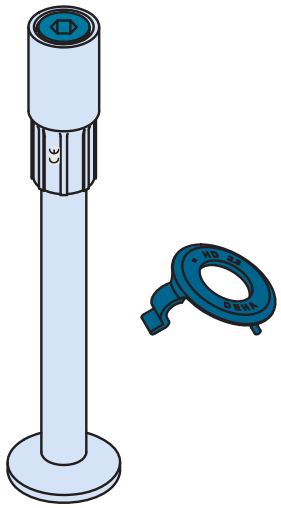


Fig. 7

⚠ The sealing plate lip is installed towards the formwork to seal the underneath of the nailing plate.

# HALFEN HD SOCKET LIFTING SYSTEM
## HD Anchor – Dimensions

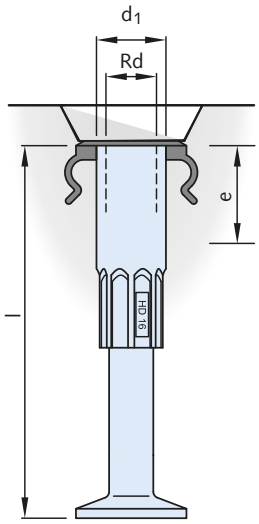
### HD Anchors – Dimensions



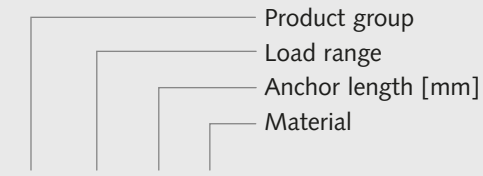
**Application:**

For transporting reinforced concrete elements of various sizes.
**Load classes:** 1,3 – 25,0

**Scope of delivery:** The identification cap is included in delivery up to load class 15,0 (not available for load class 25,0).




**Ordering example**




**6360 - 2,5 - 200 A4**

**HD Anchor — Dimensions**

| Load class | | Article name Socket zinc-plated | Order no. 0740.130- | Article name Socket stainless steel A4 | Order no. 0740.130- | Thread diameter Rd | Sleeve-diameter ① $d_1$ [mm] | Length l [mm] | Screw depth e [mm] |
|---|---|---|---|---|---|---|---|---|---|
| | 1,3 | 6360- 1,3-130 | 00001 | 6360- 1,3-130 A4 | 00009 | 12 | 17 (15.5) | 130 | 31 |
| | 2,5 | 6360- 2,5-140 | 00040 | – | – | 16 | 22 (21) | 140 | 36 |
| | 2,5 | 6360- 2,5-200 | 00002 | 6360- 2,5-200 A4 | 00010 | 16 | 22 (21) | 200 | 36 |
| | 4,0 | 6360- 4,0-258 | 00003 | 6360- 4,0-258 A4 | 00011 | 20 | 27 (26) | 258 | 42 |
| | 5,0 | 6360- 5,0-325 | 00004 | 6360- 5,0-325 A4 | 00012 | 24 | 32 | 325 | 48 |
| | 7,5 | 6360- 7,5-400 | 00005 | 6360- 7,5-400 A4 | 00013 | 30 | 39 | 400 | 58 |
| | 10,0 | 6360-10,0-475 | 00006 | 6360-10,0-475 A4 | 00014 | 36 | 47 | 475 | 66 |
| | 12,5 | 6360-12,5-550 | 00007 | 6360-12,5-550 A4 | 00015 | 42 | 55 | 550 | 75 |
| | 15,0 | 6360-15,0-575 | 00008 | 6360-15,0-575 A4 | 00016 | 52 | 68 | 575 | 89 |
| | 25,0 | 6360-25,0-630② | 00041 | – | – | 64 | 83 | 630 | 98 |

① Smaller sockets in S460 grade steel are available for sleeve diameters in S355 grade specified above (see value in brackets). Delivery subject to confirmation.
② Lifted with the rotary head link 6367-64.

The value given for the concrete compressive strength in the table is for normal concrete as defined in EC2.

Please see the reinforcement drawing and the corresponding load class tables for additional required reinforcement; all additional reinforcement must be supplied by others and is not included in delivery.

We recommend using anchors with stainless steel sockets in external stair elements, especially when installed in the upperside of the element; if necessary with stainless steel heads (non-standard type).

# HALFEN HD SOCKET LIFTING SYSTEM
## HD Anchor – Load Capacities

**Allowable load capacity for HD Anchors**

| Load class | | Article name | Rd | Minimum element thickness $2 \times e_r$ [mm] | Anchor layout ① | | Allowable load capacity [kN] with concrete strength $f_{ci}$ | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 15 N/mm² for | | | 25 N/mm² for | | 35 N/mm² for | |
| | | | | | $e_1$ [mm] | $e_z$ min [mm] | **axial load** and **diagonal load** up to 30° | **diagonal load** up to 45° | **shear load** 90° | **axial load** and **diagonal load** up to 45° | **shear load** 90° | **axial load** and **diagonal load** up to 45° | **shear load** 90° |
| | 1,3 | 6360-1,3-130 | 12 | 80 | 100 | 420 | 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 | 16 | 100 | 115 | 450 | 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 | 16 | 80 | 115 | 640 | 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 | 20 | 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 |
| | 5,0 | 6360-5,0-325 | 24 | 100 | 150 | 1000 | 33.4 | 33.4 | 9.3 | 43.1 | 12.0 | 50.0 | 14.2 |
| | | | | 120 | | | 40.0 | 40.0 | 13.1 | 50.0 | 16.9 | | 20.0 |
| | | | | 140 | | | 45.6 | 42.1 | 14.7 | | 19.0 | | 22.5 |
| | | | | 160 | | | 49.0 | 42.1 | 20.0 | | 25.8 | | 28.0 |
| | 7,5 | 6360-7,5-400 | 30 | 140 | 190 | 1230 | 56.0 | 56.0 | 18.1 | 72.3 | 23.4 | 75.0 | 27.7 |
| | | | | 160 | | | 66.8 | 66.8 | 24.2 | 75.0 | 31.2 | | 36.9 |
| | | | | 180 | | | 71.8 | 67.7 | 31.1 | | 40.1 | | 42.5 |
| | | | | 200 | | | 75.0 | 67.7 | 39.1 | | 42.5 | | 42.5 |
| | 10,0 | 6360-10,0-475 | 36 | 160 | 200 | 1460 | 78.7 | 78.7 | 24.0 | 100.0 | 30.9 | 100.0 | 36.5 |
| | | | | 180 | | | 90.7 | 90.7 | 30.5 | | 39.4 | | 46.6 |
| | | | | 200 | | | 98.3 | 92.6 | 38.1 | | 49.1 | | 57.0 |
| | | | | 220 | | | 100.0 | 92.6 | 46.2 | | 57.0 | | 57.0 |
| | 12,5 | 6360-12,5-550 | 42 | 180 | 215 | 1690 | 111.6 | 111.6 | 33.2 | 125.0 | 42.8 | 125.0 | 50.6 |
| | | | | 200 | | | 125.0 | 120.2 | 40.1 | | 51.7 | | 61.1 |
| | | | | 220 | | | 125.0 | 120.2 | 48.4 | | 62.4 | | 71.0 |
| | | | | 240 | | | 125.0 | 120.2 | 57.9 | | 71.0 | | 71.0 |
| | 15,0 | 6360-15,0-575 | 52 | 180 | 240 | 1760 | 114.1 | 114.1 | 29.2 | 147.4 | 37.7 | 150.0 | 44.6 |
| | | | | 200 | | | 126.8 | 126.8 | 36.2 | 150.0 | 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 |
| | | | | 280 | | | 150.0 | 144.8 | 72.5 | | 85.5 | | 85.5 |
| | 25,0 | 6360-25,0-630 | 64 | 240 | 300 | 1890 | 167.0 | 133.6 | 51.0 | 215.5 | 65.5 | 250.0 | 77.6 |
| | | | | 300 | | | 186.7 | 149.3 | 85.0 | 250.0 | 109.5 | | 129.7 |
| | | | | 350 | | | 201.6 | 161.3 | 114.5 | | 160.7 | | 172.4 |
| | | | | 400 | | | 215.5 | 172.4 | 136.8 | | 162.5 | | 175.0 |
| | | | | 500 | | | 241.0 | 192.8 | 156.5 | | 162.5 | | 175.0 |

① $e_z$ = min. anchor spacing; $e_z/2$ = min. edge distance; $f_{ci}$ = cube concrete strength at time of lifting

# HD Anchor – Load Capacities

## Load capacity

### Axial load up to 10°

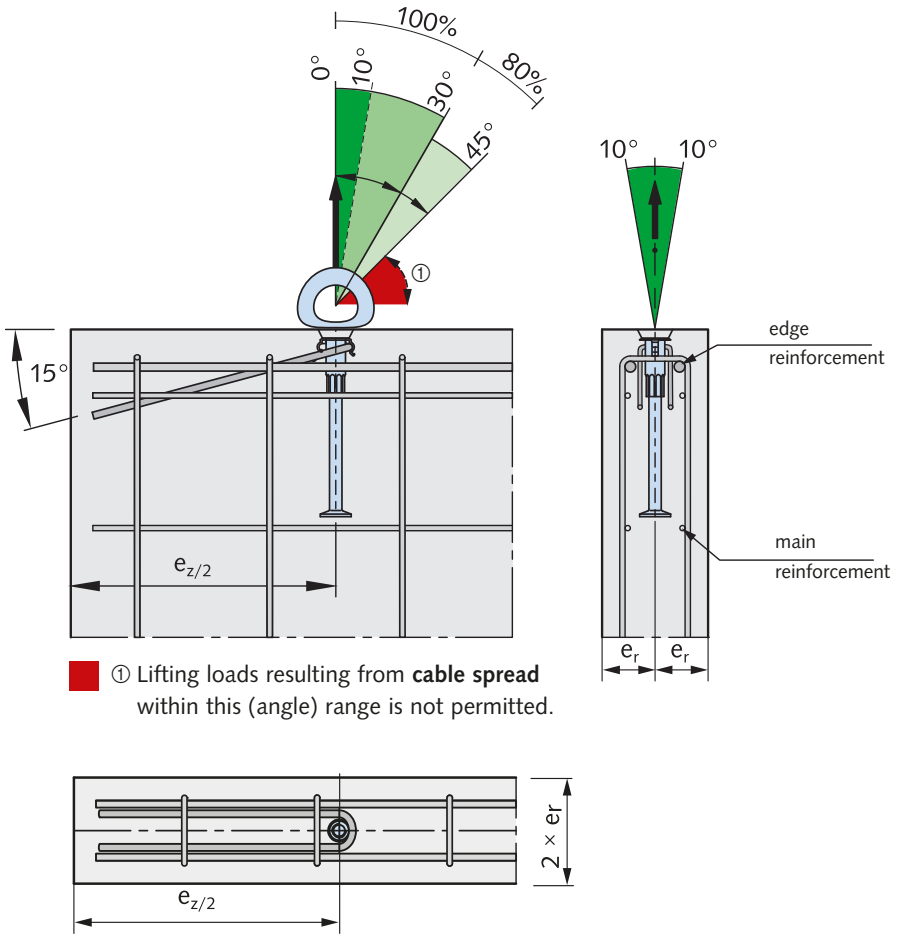
- no diagonal reinforcement is required
- 100 % load capacity according to table on → page 22

### diagonal load; 10° to 30°

- 100 % load capacity according to table on → page 22, diagonal reinforcement is not required if $e_r \geq e_1$ (table page 22)
- shear reinforcement installed on both sides of the anchor can be used instead of diagonal reinforcement

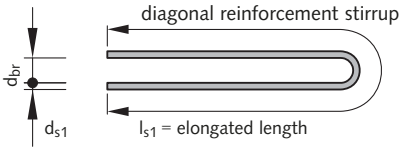
### diagonal load; 30° to 45°

- diagonal reinforcement is always required
- approximately 80 % loadable in 15 N/mm²; 100 % loadable from 25 N/mm² according to the table → page 22
- shear reinforcement installed on both sides of the anchor can be used instead of diagonal reinforcement



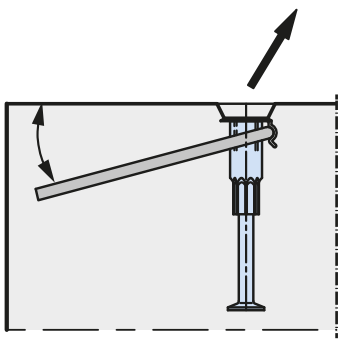

① Lifting loads resulting from **cable spread** within this (angle) range is not permitted.




The bending roll diameter according to EC2 may be disregarded.

Diagonal reinforcement must be installed with direct contact to the socket.



Always install diagonal rebar opposite the direction of the load.

Information on reinforcement: see following page

# HALFEN HD SOCKET LIFTING SYSTEM
## HD Anchor – Reinforcement

**Reinforcement — HD Anchors**

| Load class | | Article name | Rd | Minimum element thickness $2 \times e_r$ [mm] | ④ Main reinforcement mesh both sides [mm²/m] | ⑤ Required addditional reinforcement* [mm] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **axial load** 10° [β] | **diagonal load** up to 30° [β] | | | **diagonal load** up to 45° [β] | | | **shear load** 90° [β] | | | |
| | | | | | | edge reinforce-ment | $d_{s1}$ | $l_{s1}$ ①② | $d_{br}$ | $d_{s1}$ | $l_{s1}$ ①② | $d_{br}$ | $d_{s2}$ | $l_{s2}$ ② | $h_2$ ③ | $r_1$ |
| | 1,3 | 6360- 1,3-130 | 12 | 80 | 188 | – | ø 8 | 850 | 30 | ø 8 | 1000 | 30 | ø 8 | 550 | 33 | 15 |
| | | | | 100 | | | | | | | | | | | 43 | |
| | | | | 120 | | | | | | | | | | | 53 | |
| | 2,5 | 6360- 2,5-140 | 16 | 100 | 188 | – | ø 10 | 1200 | 30 | ø 10 | 1400 | 30 | ø 12 | 750 | 47 | 20 |
| | | | | 120 | | | | | | | | | | | 57 | |
| | | | | 140 | | | | | | | | | | | 67 | |
| | | 6360- 2,5-200 | 16 | 80 | 188 | – | ø 8 | 1000 | 30 | ø 10 | 1200 | 30 | ø 12 | 750 | 37 | 20 |
| | | | | 100 | | | | | | | | | | | 47 | |
| | | | | 120 | | | | | | | | | | | 57 | |
| | 4,0 | 6360- 4,0-258 | 20 | 80 | 188 | – | ø 10 | 1200 | 40 | ø 12 | 1750 | 40 | ø 16 | 910 | 42 | 25 |
| | | | | 100 | | | | | | | | | | | 52 | |
| | | | | 120 | | | | | | | | | | | 62 | |
| | | | | 140 | | | | | | | | | | | 72 | |
| | | | | 160 | | | | | | | | | | | 82 | |
| | 5,0 | 6360- 5,0-325 | 24 | 100 | 188 | – | ø 12 | 1750 | 40 | ø 14 | 2000 | 40 | ø 16 | 1080 | 56 | 25 |
| | | | | 120 | | | | | | | | | | | 66 | |
| | | | | 140 | | | | | | | | | | | 76 | |
| | | | | 160 | | | | | | | | | | | 86 | |
| | 7,5 | 6360-7,5-400 | 30 | 140 | 188 | 2 ø 12 | ø 14 | 1750 | 50 | ø 16 | 2000 | 50 | ø 20 | 1300 | 84 | 30 |
| | | | | 160 | | | | | | | | | | | 94 | |
| | | | | 180 | | | | | | | | | | | 104 | |
| | | | | 200 | | | | | | | | | | | 114 | |
| | 10,0 | 6360-10,0-475 | 36 | 160 | 188 | 2 ø 14 | ø 16 | 2000 | 50 | ø 20 | 2050 | 60 | ø 20 | 1690 | 98 | 30 |
| | | | | 180 | | | | | | | | | | | 108 | |
| | | | | 200 | | | | | | | | | | | 118 | |
| | | | | 220 | | | | | | | | | | | 128 | |
| | 12,5 | 6360-12,5-550 | 42 | 180 | 188 | 2 ø 14 | ø 20 | 2050 | 60 | ø 20 | 2200 | 60 | ø 25 | 1650 | 117 | 40 |
| | | | | 200 | | | | | | | | | | | 127 | |
| | | | | 220 | | | | | | | | | | | 137 | |
| | | | | 240 | | | | | | | | | | | 147 | |
| | 15,0 | 6360-15,0-575 | 52 | 180 | 188 | 2 ø 14 | ø 20 | 2200 | 80 | ø 25 | 2200 | 80 | ø 25 | 1940 | 123 | 40 |
| | | | | 200 | | | | | | | | | | | 133 | |
| | | | | 220 | | | | | | | | | | | 143 | |
| | | | | 240 | | | | | | | | | | | 153 | |
| | | | | 280 | | | | | | | | | | | 173 | |
| | 25,0 | 6360-25,0-630 | 64 | 240 | 188 | 2 ø 16 | ø 25 | 2200 | 100 | 2 ø 25 | 2200 | 100 | 2 ø 25 | 2200 | 174 | 40 |
| | | | | 300 | | | | | | | | | | | 204 | |
| | | | | 350 | | | | | | | | | | | 229 | |
| | | | | 400 | | | | | | | | | | | 254 | |
| | | | | 500 | | | | | | | | | | | 304 | |

① This reinforcement applies for 15 N/mm² concrete compression grade, shorter stirrups may be feasible for higher compression grades.
② elongated length ③ with $c_{min}$ = 20 mm
④ bent mesh reinforcement or equivalent rebar reinforcement

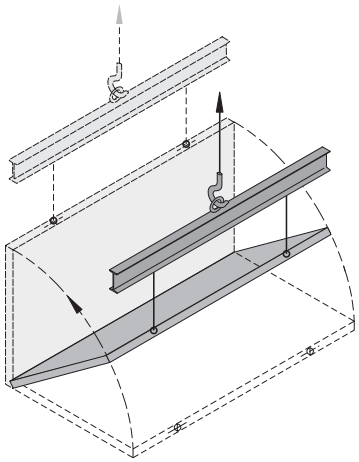
⑤ Diagonal load reinforcement and transverse stress reinforcement must be installed with direct contact to the socket. For this application it is irrelevant if the minimal bending roll diameter is below requirement.

*** additional reinforcement must be provided on-site**

# HD Anchor – Reinforcement

## Shear load at 90°

› tilting 90° (horizontal to vertical)
› load capacity → see table on page 20

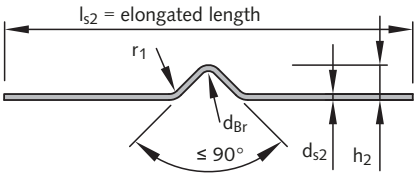


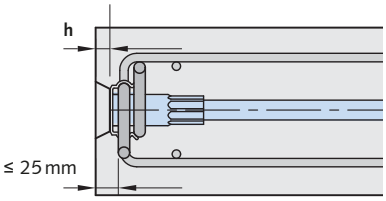
The shear reinforcement on both sides also serves as diagonal load reinforcement. Additional diagonal load reinforcement is not required.

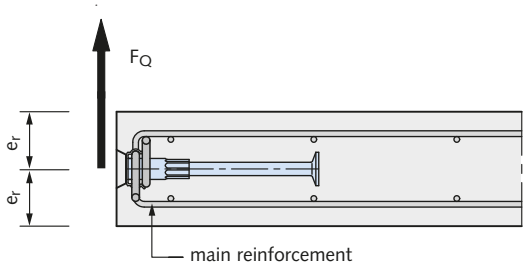
The additional shear reinforcement must be installed with full contact to the anchor.

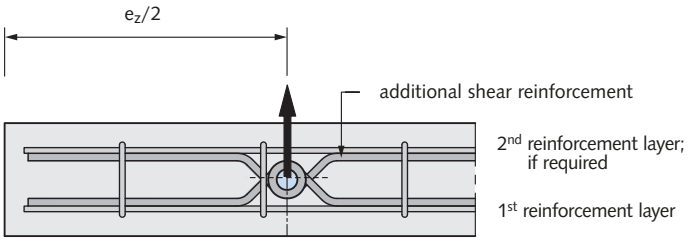
> ⚠ The height for the reinforcement depends on the installation depth for the socket and not on the required concrete cover.

### Additional shear reinforcement



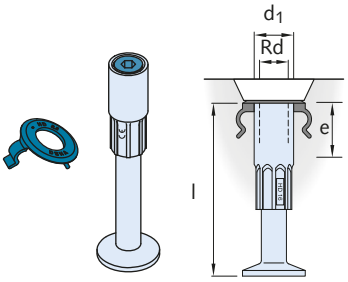




# HALFEN HD SOCKET LIFTING SYSTEM
## HD Short Anchors

### Allowable load capacities, dimensions and reinforcement for HD Short anchors




**Application:** For lifting slab-type elements, floor slabs and similar.
**Load classes:** 1,3 – 7,5

⚠ Not suitable for lifting wall elements! Not suitable for shear loads in walls!

Table key:
① Smaller diameter sockets are available in S460 for selected sleeve diameter in S355 (see values in brackets). Delivery is subject to confirmation.
② Elongated length
③ Diagonal load reinforcement must be installed with direct contact to the socket. For this application it is irrelevant if the minimal bending roll diameter is below requirement.
④ $e_r$ = edge distance ($e_r$ applies to axial load; for diagonal load, see reinforcement); $e_z$ = axial spacing
⑤ The values for intermediate slab thicknesses may be interpolated. $f_{ci}$ = cube concrete strength at time of lifting

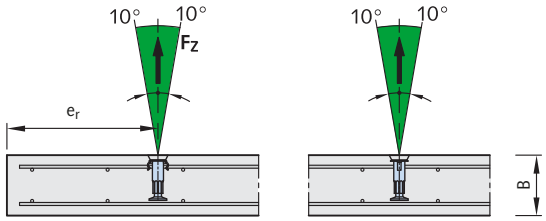
#### Dimensions and reinforcement – HD Short anchor

| Load class | | Article name **zinc-plated** | Order no. 0740.130- | Article name stainless steel A4 | Order no. 0740.130- | Dimensions HD Short anchors Rd | $d_1$ ① | l [mm] | e [mm] | Main reinforcement mesh both sides mm²/m | Required additional reinforcement ③ for **shear load** up to 45° $d_{s1}$ | $l_{s1}$ ② [mm] 15 N/mm² | 25 N/mm² | 35 N/mm² | $d_{br}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1,3 | 6360-1,3-070 | 00017 | 6360-1,3-070 A4 | 00021 | 12 | 17 (15.5) | 70 | 31 | 188 | 10 | 800 | 700 | 600 | 30 |
| | 2,5 | 6360-2,5-090 | 00018 | 6360-2,5-090 A4 | 00022 | 16 | 22 (21) | 90 | 36 | 188 | 12 | 900 | 860 | 750 | 30 |
| | 4,0 | 6360-4,0-125 | 00019 | 6360-4,0-125 A4 | 00023 | 20 | 27 (26) | 125 | 42 | 188 | 14 | 1020 | 860 | 750 | 40 |
| | 5,0 | 6360-5,0-140 | 00020 | 6360-5,0-140 A4 | 00024 | 24 | 32 | 140 | 48 | 188 | 14 | 1650 | 1400 | 1200 | 40 |
| | 7,5 | 6360-7,5-185 | 00038 | 6360-7,5-185 A4 | 00039 | 30 | 39 | 185 | 58 | 188 | 16 | 2000 | 1600 | 1400 | 50 |

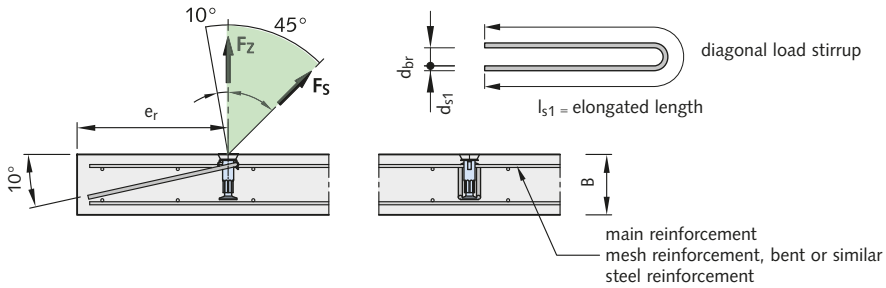
#### Load capacity – HD Short anchor

| Load class | | Article name | Anchor layout ④ $e_r$ [mm] | $e_z$ min [mm] | Increased slab thickness B ⑤ [mm] | Load capacity [kN] at concrete compression strength $f_{ci}$ for **axial and shear load** up to 45° 15 N/mm² | 25 N/mm² | 35 N/mm² | Minimal slab thickness B ⑤ [mm] | Load capacity [kN] at concrete compression strength $f_{ci}$ for **axial load** and **diagonal load** up to 45° 15 N/mm² | 25 N/mm² | 35 N/mm² |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1,3 | 6360-1,3-070 | 140 | 210 | 115 | 13.0 | 13.0 | 13.0 | 115 | 13.0 | 13.0 | 13.0 |
| | 2,5 | 6360-2,5-090 | 180 | 270 | 160 | 19.5 | 25.0 | 25.0 | 125 | 16.5 | 21.3 | 25.0 |
| | 4,0 | 6360-4,0-125 | 250 | 375 | 220 | 31.2 | 40.0 | 40.0 | 160 | 25.3 | 32.6 | 38.6 |
| | 5,0 | 6360-5,0-140 | 280 | 420 | 275 | 39.3 | 50.0 | 50.0 | 175 | 29.1 | 37.5 | 44.4 |
| | 7,5 | 6360-7,5-185 | 370 | 560 | 360 | 59.4 | 75.0 | 75.0 | 240 | 44.9 | 57.9 | 68.5 |

#### No diagonal load stirrup; axial load up to 10°




#### With diagonal load stirrup diagonal load up to 45°



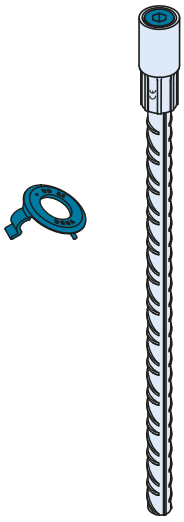

See reinforcement drawings and the load class tables for required additional reinforcement; must be provided on site.

The value for the concrete compressive strength is for normal concrete according to DIN EN 206; resp. DIN 1045-1.

Diagonal load reinforcement is not required if the axial load does not deviate more than 10° from the vertical.

# HALFEN HD SOCKET LIFTING SYSTEM
## HD Rod Anchor – Dimensions

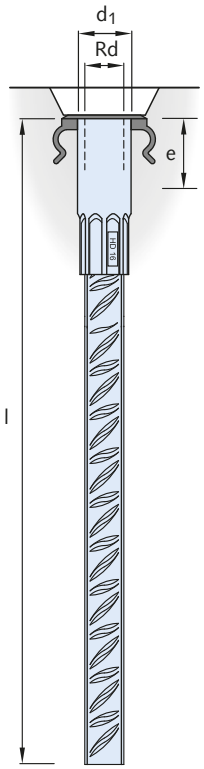
### Dimensions – HD Rod anchor



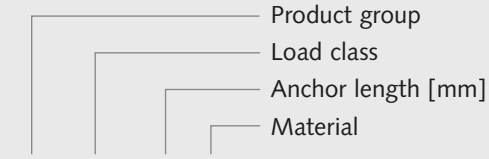
**Application:**
Used in minimal thickness precast concrete elements; e.g. prefabricated garages, transformer substations, utility and modular structures.

**Load classes:** 1,3 – 15,0

**Scope of delivery:** The identification cap is included in delivery.




**Ordering example**




**Dimensions — HD Rod anchor**

| Load class | | Article name **socket zinc-plated** | Order no. 0740.140- | Article name **socket stainless steel A4** | Order no. 0740.140- | Thread diameter Rd | Socket diameter $d_1$ [mm] | Length l [mm] | Screw depth e [mm] |
|---|---|---|---|---|---|---|---|---|---|
| | 1,3 | 6361-1,3-0300 | 00001 | 6361-1,3-0300 A4 | 00009 | 12 | 17 (15.5) | 300 | 31 |
| | 2,5 | 6361-2,5-0400 | 00002 | 6361-2,5-0400 A4 | 00010 | 16 | 22 (21) | 400 | 36 |
| | 4,0 | 6361-4,0-0520 | 00003 | 6361-4,0-0520 A4 | 00011 | 20 | 27 (26) | 520 | 42 |
| | 5,0 | 6361-5,0-0540 | 00004 | 6361-5,0-0540 A4 | 00012 | 24 | 32 | 540 | 48 |
| | 7,5 | 6361-7,5-0700 | 00005 | 6361-7,5-0700 A4 | 00013 | 30 | 39 | 700 | 58 |
| | 10,0 | 6361-10,0-0800 | 00006 | 6361-10,0-0800 A4 | 00014 | 36 | 47 | 800 | 66 |
| | 12,5 | 6361-12,5-0920 | 00007 | 6361-12,5-0920 A4 | 00015 | 42 | 55 | 920 | 75 |
| | 15,0 | 6361-15,0-1100 | 00008 | 6361-15,0-1100 A4 | 00016 | 52 | 68 | 1100 | 89 |

① Smaller diameter sockets are available in S460 for selected sleeve diameter in S355 (see values in brackets). Delivery is subject to confirmation.

See reinforcement drawings and the load class tables on the following pages for required additional reinforcement.*

The value for the concrete strength $f_{ci}$ is for normal concrete according to DIN EN 206; resp. DIN 1045-1.

***additional reinforcement must be provided on-site**

# HALFEN HD SOCKET LIFTING SYSTEM
## HD Rod Anchor – Load Capacities

**Load capacities – HD Rod anchor**

| Load class | | Article name | Rd | Minimum element thickness $2 \times e_r$ [mm] | Anchor layout ① $e_1$ with $f_{ci}$ = 15 [N/mm²] | $e_1$ with $f_{ci}$ = 25 [N/mm²] or higher | $e_z$ min | Load capacity [kN] with concrete strength $f_{ci}$ 15 N/mm² for **axial** and **diagonal load** up to 30° | 15 N/mm² for **diagonal load** up to 45° | 15 N/mm² for **shear load** 90° | 25 N/mm² for **axial** and **diagonal load** up to 45° | 25 N/mm² for **shear load** 90° | 35 N/mm² for **axial** and **diagonal load** up to 45° | 35 N/mm² for **shear load** 90° |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1,3 | 6361-1,3-0300 | 12 | 60 | 100 | 85 | 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 |
| | 2,5 | 6361-2,5-0400 | 16 | 80 | 115 | 100 | 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 |
| | 4,0 | 6361-4,0-0520 | 20 | 80 | 140 | 120 | 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 |
| | 5,0 | 6361-5,0-0540 | 24 | 100 | 150 | 125 | 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 | | | | 50.0 | 42.1 | 20.0 | | 25.8 | | 28.0 |
| | 7,5 | 6361-7,5-0700 | 30 | 120 | 190 | 160 | 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 |
| | 10,0 | 6361-10,0-0800 | 36 | 140 | 200 | 170 | 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 |
| | 12,5 | 6361-12,5-0920 | 42 | 140 | 215 | 185 | 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 |
| | 15,0 | 6361-15,0-1100 | 52 | 160 | 240 | 205 | 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; $f_{ci}$ = cube concrete strength at time of lifting

### Axial load up to 10°

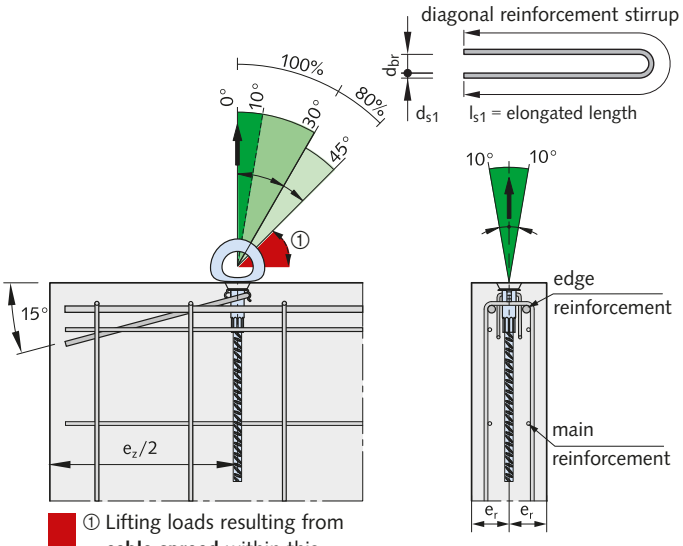
- no diagonal reinforcement is required
- 100 % load capacity (see table above)

### Diagonal load; 10° to 30°

- 100 % load capacity (see table above)
- diagonal reinforcement is not required if $e_r \geq e_1$ (see table above)
- shear reinforcement installed on both sides of the anchor can be used instead of diagonal reinforcement

### Diagonal load; 30° to 45°

- diagonal reinforcement is always required
- approximately 80 % loadable in 15 N/mm²; 100 % loadable from 25 N/mm² (see table above)
- shear reinforcement installed on both sides of the anchor can be used instead of diagonal reinforcement




① Lifting loads resulting from **cable spread** within this (angle) range is not permitted.

# HALFEN HD SOCKET LIFTING SYSTEM
## HD Rod Anchor – Reinforcement

**Reinforcement – HD Rod anchor**

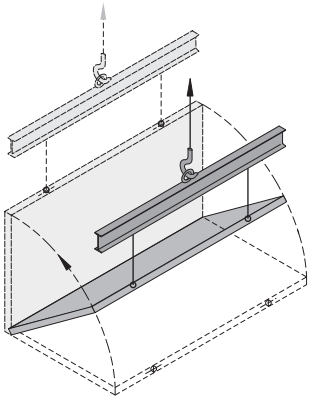
| Load class | | Article name | Rd | Minimum element thickness $2 \times e_r$ [mm] | Main reinforcement mesh both sides④ [mm²/m] | Required additional reinforcement* [mm] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **axial load** up to 10° [β] | **diagonal load** up to 30° | | | **diagonal load** up to 45° | | | **shear load** 90° | | | |
| | | | | | | edge-reinforcement | $d_{s1}$ | $l_{s1}$ 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 | 12 | 60 | 188 | – | ø 8 | 860 | 30 | ø8 | 1000 | 30 | 8 | 550 | 23 | 15 |
| | | | | 80 | | | | | | | | | | | 33 | |
| | | | | 100 | | | | | | | | | | | 43 | |
| | 2,5 | 6361-2,5-0400 | 16 | 80 | 188 | – | ø 8 | 1000 | 30 | ø10 | 1200 | 30 | 12 | 750 | 37 | 20 |
| | | | | 100 | | | | | | | | | | | 47 | |
| | | | | 120 | | | | | | | | | | | 57 | |
| | 4,0 | 6361-4,0-0520 | 20 | 80 | 188 | 2 ø 12 | ø 10 | 1200 | 40 | ø12 | 1750 | 40 | 16 | 910 | 42 | 25 |
| | | | | 100 | | | | | | | | | | | 52 | |
| | | | | 120 | | | | | | | | | | | 62 | |
| | | | | 140 | | | | | | | | | | | 72 | |
| | | | | 160 | | | | | | | | | | | 82 | |
| | 5,0 | 6361-5,0-0540 | 24 | 100 | 188 | 2 ø 12 | ø 12 | 1750 | 40 | ø14 | 2000 | 40 | 16 | 1080 | 56 | 25 |
| | | | | 120 | | | | | | | | | | | 66 | |
| | | | | 140 | | | | | | | | | | | 76 | |
| | | | | 160 | | | | | | | | | | | 86 | |
| | 7,5 | 6361-7,5-0700 | 30 | 120 | 188 | 2 ø 14 | ø 14 | 1750 | 50 | ø16 | 2000 | 50 | 20 | 1300 | 74 | 30 |
| | | | | 140 | | | | | | | | | | | 84 | |
| | | | | 160 | | | | | | | | | | | 94 | |
| | | | | 180 | | | | | | | | | | | 104 | |
| | 10,0 | 6361-10,0-0800 | 36 | 140 | 188 | 2 ø 14 | ø 16 | 2000 | 50 | ø20 | 2050 | 60 | 20 | 1690 | 88 | 30 |
| | | | | 160 | | | | | | | | | | | 98 | |
| | | | | 180 | | | | | | | | | | | 108 | |
| | | | | 200 | | | | | | | | | | | 118 | |
| | 12,5 | 6361-12,5-0920 | 42 | 140 | 188 | 2 ø 14 | ø 20 | 2050 | 60 | ø20 | 2200 | 60 | 25 | 1650 | 97 | 40 |
| | | | | 160 | | | | | | | | | | | 107 | |
| | | | | 180 | | | | | | | | | | | 117 | |
| | | | | 200 | | | | | | | | | | | 127 | |
| | 15,0 | 6361-15,0-1100 | 52 | 160 | 188 | 2 ø 14 | ø 20 | 2200 | 80 | ø25 | 2200 | 80 | 25 | 1940 | 113 | 40 |
| | | | | 180 | | | | | | | | | | | 123 | |
| | | | | 200 | | | | | | | | | | | 133 | |
| | | | | 220 | | | | | | | | | | | 143 | |
| | | | | 240 | | | | | | | | | | | 153 | |

① This reinforcement applies for 15 N/mm² concrete compression grade, shorter stirrups may be feasible for higher compression grades.
② elongated length ③ with $c_{min}$ = 20 mm
④ bent mesh reinforcement or equivalent rebar reinforcement
⑤ Diagonal load reinforcement and transverse stress reinforcement must be installed with direct contact to the socket. For this application it is irrelevant if the minimal bending roll diameter is below requirement.

*** additional reinforcement must be provided on-site**

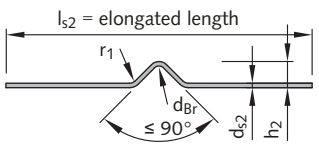
**Shear load with 90°**

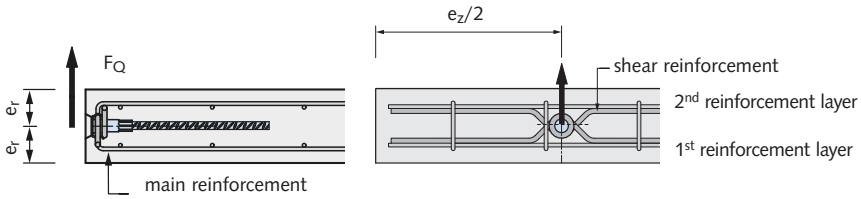
- tilting 90° (horizontal to vertical)
- load capacity → see table on page 28



The shear reinforcement on both sides also serves as diagonal load reinforcement. Additional diagonal load reinforcement is not required. The additional shear reinforcement must be installed with full contact to the threaded socket.

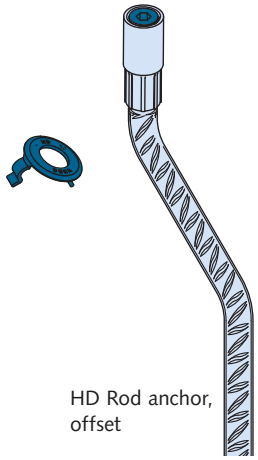
**Shear reinforcement**



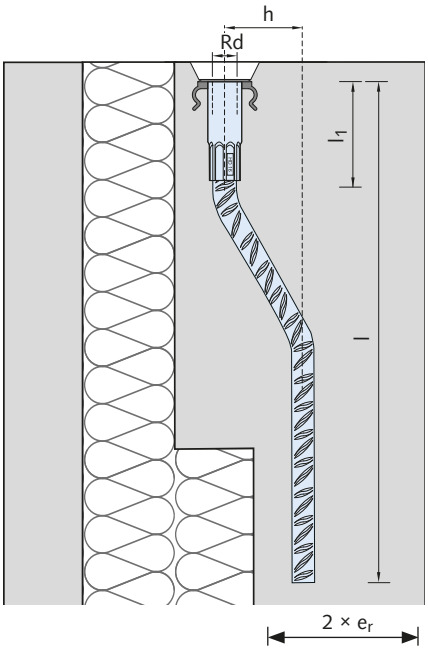
# HALFEN HD SOCKET LIFTING SYSTEM
## Offset HD Rod Anchor and Additional Reinforcement

### Dimensions – offset HD Rod anchor



HD Rod anchor, offset

**Application:**
The offset spherical head lifting anchor differs from the normal spherical head lifting anchor only by its cranked shape. This unique shape permits the use of this anchor for sandwich panels. The thickness of the load panel is increased around the anchor.




**Dimensions — offset HD Rod anchor**

| Load class | | Article name | Order no. 0740.220- | Rd | l [mm] | $l_1$ [mm] | h [mm] | Load capacity ① [kN] ② |
|---|---|---|---|---|---|---|---|---|
| | 5,0 | 6361G - 5,0-0800 | 00001 | 24 | 800 | 135 | 150 | 50.0 |
| | 7,5 | 6361G - 7,5-0960 | 00002 | 30 | 960 | 165 | 150 | 75.0 |
| | 10,0 | 6361G - 10,0-1060 | 00003 | 36 | 1060 | 180 | 150 | 100.0 |
| | 12,5 | 6361G-12,5-1180 | 00004 | 42 | 1180 | 210 | 150 | 125.0 |
| | 15,0 | 6361G-15,0-1360 | 00005 | 52 | 1360 | 230 | 150 | 150.0 |

① for ≥ 30 N/mm² ② for axial and diagonal load ≤ 10°

⚠ Please enquire for minimum order quantity and delivery times for other offset requirements (h).

### Reinforcement — offset HD Rod anchors

**Reinforcement***

① u-bar

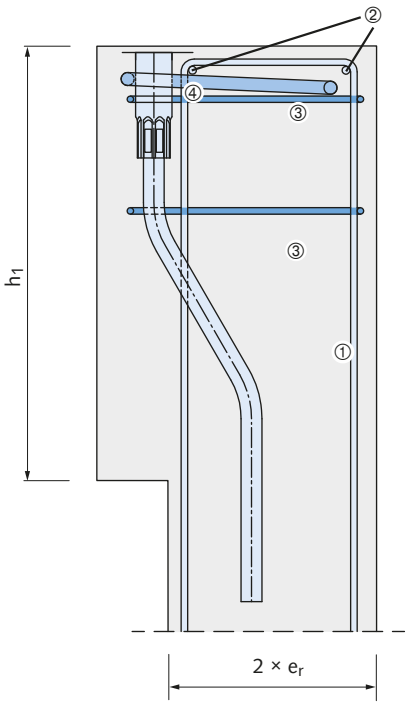
② edge reinforcement

③ stirrup

④ additional reinforcement
(only required for face-up production)

Diagonal load reinforcement and transverse stress reinforcement must be installed with direct contact to the socket. For this application it is irrelevant if the minimal bending roll diameter is below requirement.

***reinforcement must be provided on-site**




⚠ The offset HD Anchor must be completely enveloped in concrete. The thickness in the load-bearing layer needs to be increased around the HD Anchor. The concrete cover on all sides of the anchor must be at least 2.5 cm.

# HALFEN HD SOCKET LIFTING SYSTEM
## Offset HD Rod Anchor and Additional Reinforcement

**Offset HD Rod anchor – reinforcement**

| Load class | | Article name | Main reinforcement mesh [mm²/m] | Edge reinforcement ② number | Edge reinforcement ② ⌀ [mm] | Stirrup reinforcement ③ number | Stirrup reinforcement ③ ⌀ [mm] | Anchor reinforcement ④ ⌀ [mm] | Anchor reinforcement ④ length [mm] | U-bar ① number | U-bar ① ⌀ [mm] | U-bar ① leg length [mm] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5,0 | 6361G - 5,0 - 0800 | 2 × 188 | 2 | 10 | 2 | 8 | 16 | 1300 | 4 | 8 | 1300 |
| | 7,5 | 6361G - 7,5 - 0960 | 2 × 188 | 2 | 12 | 2 | 8 | 20 | 1300 | 4 | 10 | 1450 |
| | 10,0 | 6361G - 10,0 - 1060 | 2 × 188 | 2 | 12 | 2 | 10 | 20 | 1700 | 4 | 10 | 1600 |
| | 12,5 | 6361G - 12,5 - 1180 | 2 × 188 | 2 | 12 | 2 | 10 | 25 | 1800 | 4 | 10 | 1800 |
| | 15,0 | 6361G - 15,0 - 1360 | 2 × 188 | 2 | 12 | 2 | 10 | 25 | 1940 | 4 | 10 | 2050 |

**Reinforcement***

① u-bar

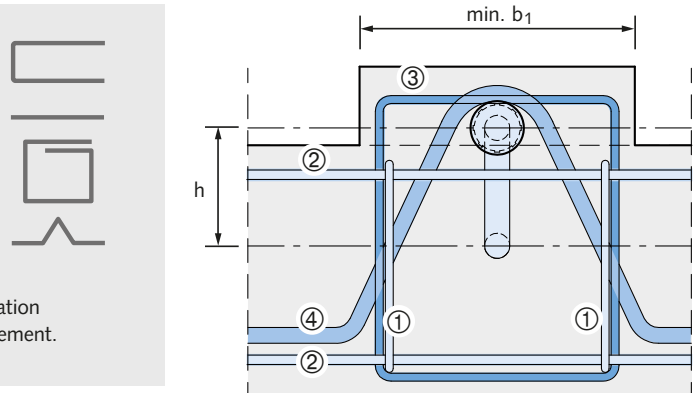
② edge reinforcement

③ stirrup

④ additional reinforcement
(only required for face-up production)

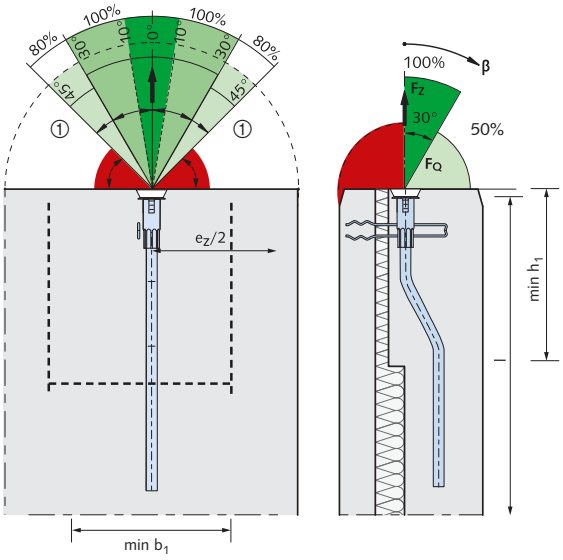
Diagonal load reinforcement and transverse stress reinforcement must be installed with direct contact to the socket. For this application it is irrelevant if the minimal bending roll diameter is below requirement.

***reinforcement must be provided on-site**

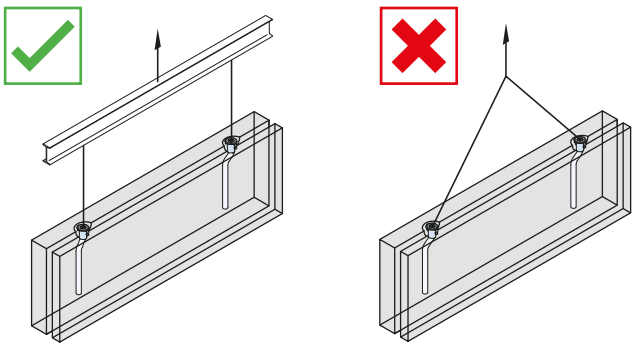



**Offset HD Rod anchor – element**

| Load class | | Article name | Minimum element thickness not allowing for anchor 2 × $e_r$ [mm] | min h1 [mm] | min b1 [mm] | min $e_z/2$ [mm] |
|---|---|---|---|---|---|---|
| | 5,0 | 6361G - 5,0 - 0800 | 100 | 615 | 350 | 550 |
| | 7,5 | 6361G - 7,5 - 0960 | 120 | 675 | 350 | 720 |
| | 10,0 | 6361G - 10,0 - 1060 | 140 | 705 | 350 | 810 |
| | 12,5 | 6361G - 12,5 - 1180 | 140 | 750 | 450 | 940 |
| | 15,0 | 6361G - 15,0 - 1360 | 160 | 780 | 450 | 1120 |




Always use a spreader beam for pitching, lifting and transporting. Using a chain hoist for lifting elements with HD Anchors is not recommended.



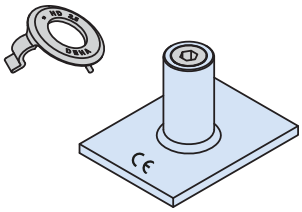
Angle range from 10°: Only permitted with 6367 Rotary head lifting link!

① Lifting loads resulting from **cable spread** within this (angle) range is not permitted.

⚠ Always use a tilting table for lifting elements upright

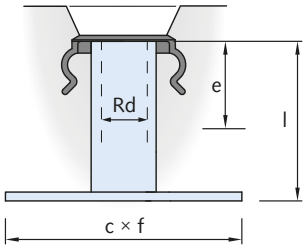
# HALFEN HD SOCKET LIFTING SYSTEM
## HD Plate Anchor

### Load capacities, dimensions and reinforcement for HD Plate anchors



**Application:**

HD Plate anchors are designed for lifting large, thin-walled, precast concrete elements which are lifted perpendicular to their main surface (slabs and shells). Also available in stainless steel.




**Dimensions and reinforcement — HD Plate anchor**

| Load class | | Article name | Order no. | Dimensions HD Plate anchor | | | | | Main reinforcement mesh, both sides ② | Required additional reinforcement* **axial** and **diagonal load** additional reinforcement | | | | **diagonal load** ④ diagonal load stirrup | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **zinc coated** | 0740.180- | Rd | l [mm] | c [mm] | f [mm] | e [mm] | [mm²/m] | $d_{s2}$ [mm] | $l_{s2}$ [mm] | $l_{s3}$ ① [mm] | h [mm] | $d_{s1}$ [mm] | $l_{s1}$ ①③ [mm] | $d_{br}$ [mm] |
| | 1,3 | 6370-1,3 | 00001 | 12 | 46 | 50 | 50 | 31 | 188 | 4 ø 8 | 60 | 425 | 40 | 10 | 750 | 30 |
| | 2,5 | 6370-2,5 | 00002 | 16 | 54 | 60 | 80 | 36 | 188 | 4 ø10 | 90 | 640 | 50 | 12 | 1250 | 30 |
| | 4,0 | 6370-4,0 | 00003 | 20 | 72 | 80 | 100 | 42 | 188 | 4 ø12 | 110 | 830 | 55 | 12 | 1400 | 40 |
| | 5,0 | 6370-5,0 | 00004 | 24 | 84 | 100 | 130 | 48 | 188 | 4 ø16 | 140 | 1140 | 60 | 16 | 1500 | 40 |
| | 7,5 | 6370-7,5 | 00005 | 30 | 98 | 130 | 130 | 58 | 257 | 4 ø16 | 140 | 1250 | 60 | 16 | 1750 | 50 |

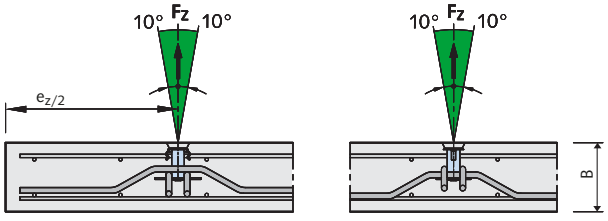
① elongated length
② mesh reinforcement, bent or similar steel-rod reinforcement
③ For concrete compressive strength 15 N/mm²; shorter stirrups may be possible for higher concrete compressive strengths.
④ Diagonal load reinforcement must be installed with direct contact to the socket.
For this application it is irrelevant if the minimal bending roll diameter is below requirement.
***additional reinforcement must be provided on-site!**

**Load capacity — HD Plate anchor**

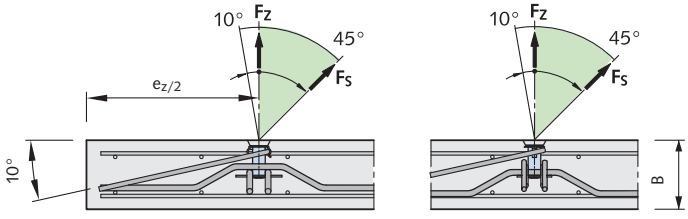
| Load class | | Article name | Minimum element thickness B [mm] | Anchor position ④ | | Load capacity [kN] with concrete compressive strength $f_{ci}$ 15 N/mm² | |
|---|---|---|---|---|---|---|---|
| | | | | $e_z/2$ [mm] | $e_z$ min [mm] | **axial load** up to 10° | **diagonal load** up to 45° |
| | 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 |

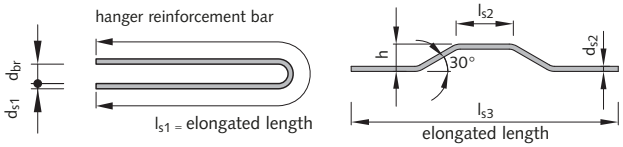
④ $e_z/2$ = edge spacing; $e_z$ = axial spacing; $f_{ci}$ = cube concrete strength at time of lifting

### No diagonal reinforcement; axial load up to 10°

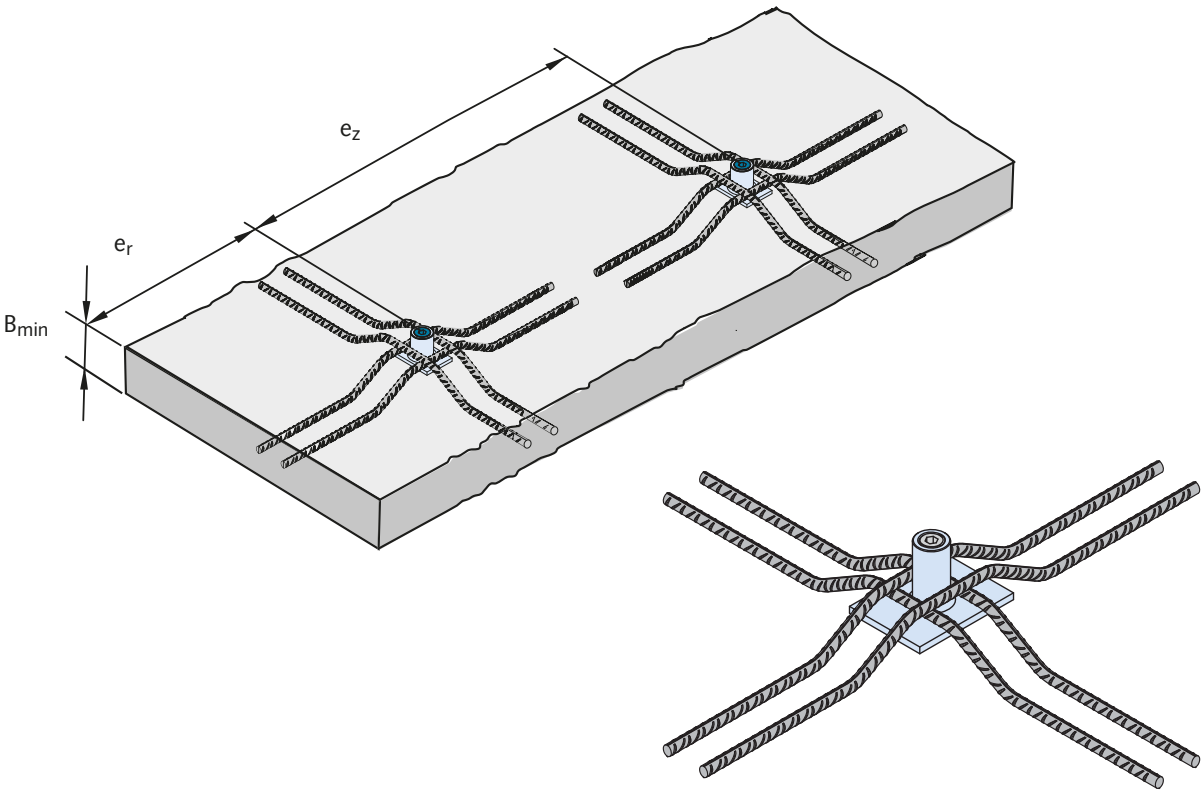



### With diagonal reinforcement; diagonal load up to 45°



## HD Plate anchor – Calculation and installation




**Verification**
Subject to slab calculation for the load case "lifting" and required bending reinforcement at the anchors.

**Slab thickness**

With diagonal load, because of the assumed bond stress, the slab thickness must not exceed 25 cm.

Observe the minimum slab thickness and reinforcement.

**Installation; no restraint reinforcement**
Additional reinforcement is placed and fixed on top of the bottom plate of the HD Plate anchor.

The rebars used as restraint reinforcement must be installed in two layers, at right angle with full contact to the foot-plate and as close as possible to the socket; the bottom layer must be installed parallel to the short sides of the plate.

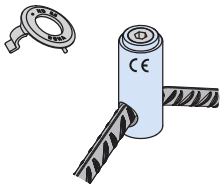
Standard reinforcement is installed.

**With restraint reinforcement**
Restraint reinforcement is required in addition to the main reinforcement and the installed crossed additional reinforcement if the HD Plate anchor is subjected to more than 10° of diagonal load.

The restraint reinforcement is installed opposite to the direction of the load.

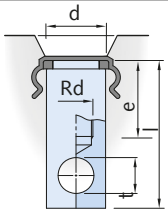
# HALFEN HD SOCKET LIFTING SYSTEM
## HD Plain Anchor

### Approved load capacity, dimensions and reinforcement; HD Plain anchors with hole



**Application:** HD Plain anchors with hole are used for lifting thin precast walls. Also available in stainless steel.

HD Plain anchors with hole are not suitable for slabs!




**Dimensions and reinforcement — HD Plain anchor [mm]**

| Load class | | Article name zinc coated | Order no. 0740.190 | Dimensions of the HD Plain anchor Rd | l [mm] | d [mm] | t [mm] | e [mm] | Mandatory reinforcement* for concrete strength $f_{ci}$ = 15 N/mm² axial load $d_{s1}$ [mm] | $l_{s1}$ ① [mm] | $d_{br1}$ [mm] | diagonal load ③ $d_{s2}$ [mm] | $l_{s2}$ ② [mm] | $d_{br2}$ [mm] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1,3 | 6376 - 1,3 | 00001 | 12 | 65 | 21 | 13.5 | 31 | 10 | 650 | 40 | 8 | 850 | 25 |
| | 2,5 | 6376 - 2,5 | 00002 | 16 | 70 | 28 | 17.0 | 36 | 12 | 1000 | 50 | 10 | 1200 | 30 |
| | 4,0 | 6376 - 4,0 | 00003 | 20 | 85 | 38 | 24.5 | 42 | 16 | 1200 | 65 | 12 | 1400 | 40 |
| | 5,0 | 6376 - 5,0 | 00004 | 24 | 93 | 40 | 25.5 | 48 | 16 | 1500 | 65 | 14 | 1750 | 50 |
| | 7,5 | 6376 - 7,5 | 00005 | 30 | 116 | 46 | 28.0 | 58 | 20 | 1750 | 80 | 16 | 2000 | 50 |
| | 10,0 | 6376 -10,0 | 00006 | 36 | 136 | 51 | 30.0 | 66 | 25 | 1850 | 100 | 20 | 2000 | 55 |

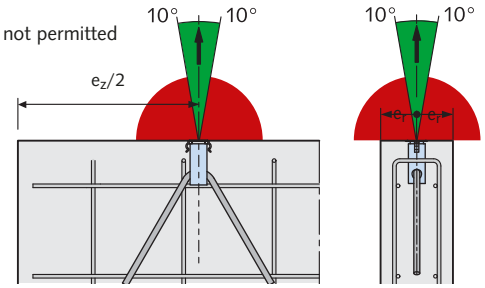
① elongated length ② for concrete compressive strength 15 N/mm²; shorter stirrups may be possible for higher concrete compressive strengths.
③ Diagonal load reinforcement must be installed with direct contact to the socket.
For this application it is irrelevant if the minimal bending roll diameter is below requirement. ***additional reinforcement must be provided on-site!**

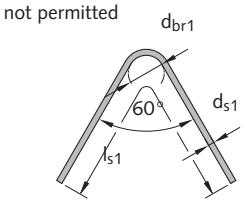
**Allowable load capacity — HD Plain anchor**

| Load class | | Article name | Minimum element thickness 2 x $e_r$ [mm] | Anchor layout ④ $e_r$ min [mm] | $e_z$ min [mm] | Load capacity [kN] for concrete strength $f_{ci}$ 15 N/mm² für axial load up to 10° | 15 N/mm² für diagonal load up to 45° | 25 N/mm² für axial load and diagonal load up to 45° | 35 N/mm² für axial load and diagonal load up to 45° |
|---|---|---|---|---|---|---|---|---|---|
| | 1,3 | 6376 - 1,3 | 80 | 40 | 500 | 13.0 | 10.5 | 13.0 | 13.0 |
| | 2,5 | 6376 - 2,5 | 100 | 50 | 600 | 25.0 | 20.0 | 25.0 | 25.0 |
| | 4,0 | 6376 - 4,0 | 110 | 55 | 700 | 40.0 | 32.0 | 40.0 | 40.0 |
| | 5,0 | 6376 - 5,0 | 120 | 60 | 750 | 50.0 | 40.0 | 50.0 | 50.0 |
| | 7,5 | 6376 - 7,5 | 130 | 65 | 1000 | 75.0 | 60.0 | 75.0 | 75.0 |
| | 10,0 | 6376 -10,0 | 140 | 70 | 1200 | 100.0 | 80.0 | 100.0 | 100.0 |

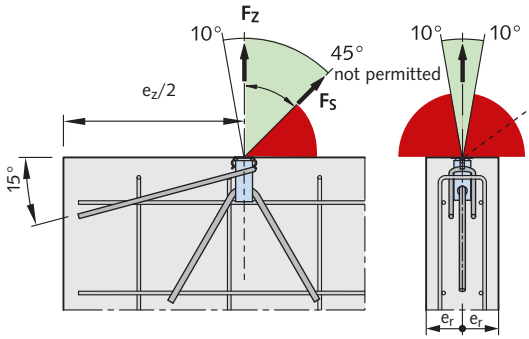
④ $e_z/2$ = min. edge distance; $e_z$ = min. anchor spacing ; $f_{ci}$ = concrete cube strength at time of lifting

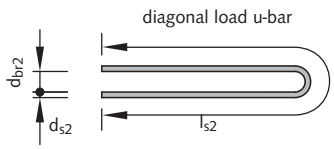
### Without diagonal load u-bar; axial load up to 10°




### With diagonal load u-bar; axial load up to 45°



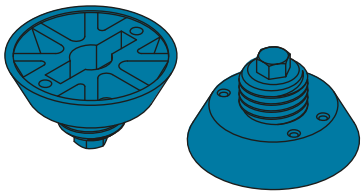

The minimum permitted axial spacing between lifting anchors is $e_z$.

The required hanger reinforcement is inserted through the lower hole in the HD Plain anchor. The hanger reinforcement must be secured in place with full contact to the anchor. Refer to the reinforcement drawings and tables for each load class for any required additional reinforcement. The value given for concrete strength $f_{ci}$ is for normal concrete according to DIN EN 206 or DIN 1045-1.

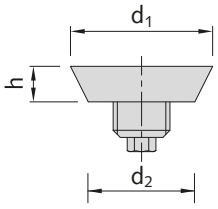
The reinforcement must be secured in place with full contact to the anchor.

# HALFEN HD SOCKET LIFTING SYSTEM
## Accessories

### HD Nailing plate – plastic



The plastic nailing plates are colour coded according to the thread size.




Plastic nailing plates are used to attach HD Anchors to formwork; they are available for thread sizes from Rd 12 to Rd 52.

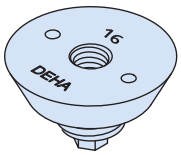
The resulting recess fits the shape of the HD Lifting link exactly.

The shape of the recess allows the lifting link to distribute shear or diagonal load more effectively into the concrete.

**HD Nailing plate; plastic**

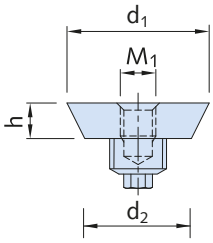
| Load class | | Article name | Order no. 0741.040- | Thread M/Rd | h [mm] | $d_1$ [mm] | $d_2$ [mm] |
|---|---|---|---|---|---|---|---|
| | 1,3 | 6358-12 | 00001 | 12 | 10 | 40 | 30 |
| | 2,5 | 6358-16 | 00003 | 16 | 10 | 40 | 30 |
| | 4,0 | 6358-20 | 00005 | 20 | 10 | 55 | 45 |
| | 5,0 | 6358-24 | 00006 | 24 | 10 | 55 | 45 |
| | 7,5 | 6358-30 | 00007 | 30 | 10 | 70 | 60 |
| | 10,0 | 6358-36 | 00008 | 36 | 10 | 70 | 60 |
| | 12,5 | 6358-42 | 00009 | 42 | 12 | 95 | 85 |
| | 15,0 | 6358-52 | 00010 | 52 | 12 | 95 | 85 |

### HD Nailing plate – steel




**Finish:** zinc plated

HD Steel nailing plates are available for thread sizes from Rd 12 to Rd 52




The resulting recess fits the shape of the HD Lifting link exactly. The shape of the recess allows the lifting link to distribute shear or diagonal load more effectively into the concrete.

The pre-assembled HD Nailing plate with adapter 6369-A is intended to be used with assembly pin 6330.

Thread can be reduced from M10/12 to M6 through applying the pre-assembled adapter.

Steel nailing plates 6369-A are delivered in a zinc plated finish for thread sizes 1,3 to 7,5.

**Nailing plate – steel**

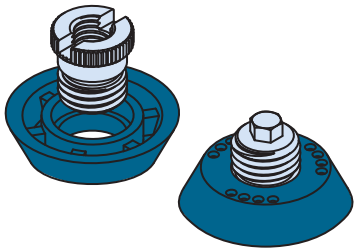
| Load class | Article name | Order no 0741.190- | for Rd | h [mm] | $d_1$ [mm] | $d_2$ [mm] | $M_1$ |
|---|---|---|---|---|---|---|---|
| 1,3 | 6369- 12 | 00001 | 12 | 10 | 40 | 30 | 6 |
| 2,5 | 6369- 16 | 00002 | 16 | 10 | 40 | 30 | 10 |
| 4,0 | 6369- 20 | 00003 | 20 | 10 | 55 | 45 | 12 |
| 5,0 | 6369- 24 | 00004 | 24 | 10 | 55 | 45 | 12 |
| 7,5 | 6369- 30 | 00005 | 30 | 10 | 70 | 60 | 12 |
| 10,0 | 6369- 36 | 00006 | 36 | 10 | 70 | 60 | 16 |
| 12,5 | 6369- 42 | 00007 | 42 | 12 | 95 | 85 | 16 |
| 15,0 | 6369- 52 | 00008 | 52 | 12 | 95 | 85 | 16 |

**Nailing plate with adapter, pre-assembled**

| Load class | Article name | Order no 0741.190- | for Rd | h [mm] | $d_1$ [mm] | $d_2$ [mm] | $M_1$ |
|---|---|---|---|---|---|---|---|
| 2,5 | 6369- 16 -A | 00102 | 16 | 10 | 40 | 30 | 6 |
| 4,0 | 6369- 20 -A | 00103 | 20 | 10 | 55 | 45 | 6 |
| 5,0 | 6369- 24 -A | 00104 | 24 | 10 | 55 | 45 | 6 |
| 7,5 | 6369- 30 -A | 00105 | 30 | 10 | 70 | 60 | 6 |

# HALFEN HD SOCKET LIFTING SYSTEM
## Accessories

### HD Nailing plate with steel core and replacement ring – Height 10 mm

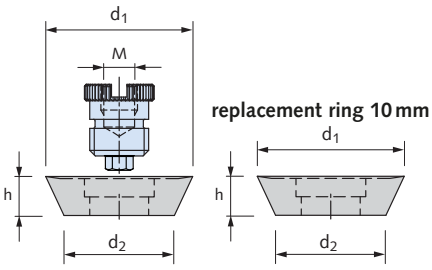


The HD Nailing plate which consists of a steel core and a replacement ring is used for fixing a HD Anchor to the formwork. Available in thread sizes Rd 12 to Rd 64.

The recess in the concrete made by the combi nailing plate matches the shape of the HD Lifting links exactly. This allows the lifting link to rest against the concrete when the anchor is subjected to diagonal or shear loads. The nailing plate core is made of chrome plated metal. The plastic ring is replaceable.

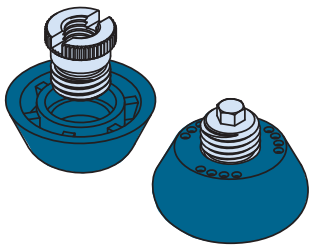
⚠ Replacement ring available separately (see Price list)

A retaining bolt is available to attach the nailing plate quickly and securely to the formwork. All bolts used to fix the HD Nailing plate to the formwork must be unscrewed and removed before striking the formwork.




| Combi nailing plate with steel-core | | | | | | | | | Replacement ring | |
|---|---|---|---|---|---|---|---|---|---|---|
| Load class | | Article name | Order no. 0741.080- | Thread M/Rd | h [mm] | $d_1$ [mm] | $d_2$ [mm] | M [mm] | Article name | Order no. 0741.090- |
| | 1,3 | 6510-12 | 00101 | 12 | 10 | 40 | 30 | 8 | 6512- 12 | 00001 |
| | 2,5 | 6510-16 | 00103 | 16 | 10 | 40 | 30 | 10 | 6512- 16 | 00003 |
| | 4,0 | 6510-20 | 00105 | 20 | 10 | 55 | 45 | 12 | 6512- 20 | 00005 |
| | 5,0 | 6510-24 | 00106 | 24 | 10 | 55 | 45 | 12 | 6512- 24 | 00006 |
| | 7,5 | 6510-30 | 00107 | 30 | 10 | 70 | 60 | 12 | 6512- 30 | 00007 |
| | 10,0 | 6510-36 | 00108 | 36 | 10 | 70 | 60 | 12 | 6512- 36 | 00008 |
| | 12,5 | 6510-42 | 00109 | 42 | 12 | 95 | 85 | 12 | 6512- 42 | 00009 |
| | 15,0 | 6510-52 | 00110 | 52 | 12 | 95 | 85 | 12 | 6512- 52 | 00010 |
| | 25,0 | 6510-64 | 00111 | 64 | 12 | 110 | 100 | 16 | 6512- 64 | 00011 |

### HD Nailing plate with steel core and replacement ring – Height 20 mm

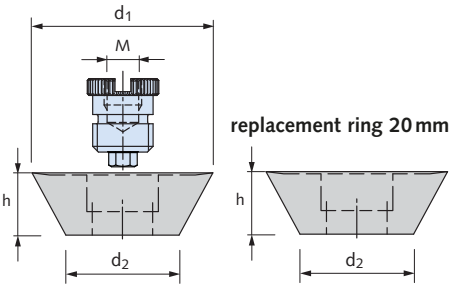


The HD Nailing plate which consists of a steel core and a replacement ring is used for fixing a HD Anchor to the formwork. Available for thread sizes from Rd 12 to Rd 52.

The nailing plate core is made of chrome plated metal; the replacement ring is made of flexible plastic.

⚠ Replacement ring available separately (see Price list)

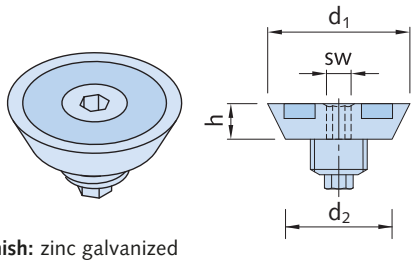
Bolts used to secure the HD Nailing plate to the formwork must be unscrewed and removed before striking the formwork.




| Nailing plate with steel-core and replacement ring | | | | | | | | | Replacement ring | |
|---|---|---|---|---|---|---|---|---|---|---|
| Load class | | Article name | Order no. 0741.210- | thread M/Rd | h [mm] | $d_1$ [mm] | $d_2$ [mm] | M [mm] | Article name | Order no. 0741.230- |
| | 1,3 | 6520-12 | 00101 | 12 | 20 | 50 | 30 | 8 | 6522- 22 | 00001 |
| | 2,5 | 6520-16 | 00103 | 16 | 20 | 50 | 30 | 8 | 6522- 16 | 00003 |
| | 4,0 | 6520-20 | 00105 | 20 | 20 | 65 | 45 | 12 | 6522- 20 | 00005 |
| | 5,0 | 6520-24 | 00106 | 24 | 20 | 65 | 45 | 12 | 6522- 24 | 00006 |
| | 7,5 | 6520-30 | 00107 | 30 | 20 | 80 | 60 | 12 | 6522- 30 | 00007 |
| | 10,0 | 6520-36 | 00108 | 36 | 20 | 80 | 60 | 12 | 6522- 36 | 00008 |
| | 12,5 | 6520-42 | 00109 | 42 | 20 | 105 | 85 | 12 | 6522- 42 | 00009 |
| | 15,0 | 6520-52 | 00110 | 52 | 20 | 105 | 85 | 12 | 6512- 52 | 00010 |

# HALFEN HD SOCKET LIFTING SYSTEM
## Accessories

### HD Magnetic plate




**Finish:** zinc galvanized

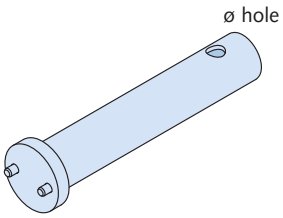
The zinc galvanized steel HD Magnetic plate can be used to secure HD Anchors to steel formwork. Available for thread sizes from Rd 12 to Rd 52. The nailing plate creates a recess in which the perfect head or the adapter is fixed.

**Magnetic plate**

| Load class | Article name | Order no. 0741.180- | Rd | h [mm] | $d_1$ [mm] | $d_2$ [mm] | SW* |
|---|---|---|---|---|---|---|---|
| 1,3 | 6365- 12 | 00001 | 12 | 12 | 40 | 30 | 6 |
| 2,5 | 6365- 16 | 00002 | 16 | 12 | 40 | 30 | 6 |
| 4,0 | 6365- 20 | 00003 | 20 | 12 | 55 | 45 | 10 |
| 5,0 | 6365- 24 | 00004 | 24 | 12 | 55 | 45 | 10 |
| 7,5 | 6365- 30 | 00005 | 30 | 12 | 70 | 60 | 16 |
| 10,0 | 6365- 36 | 00006 | 36 | 12 | 70 | 60 | 16 |
| 12,5 | 6365- 42 | 00007 | 42 | 12 | 95 | 85 | 16 |
| 15,0 | 6365- 52 | 00008 | 52 | 12 | 95 | 85 | 16 |

*metric wrench size

### Tool for steel nailing plate

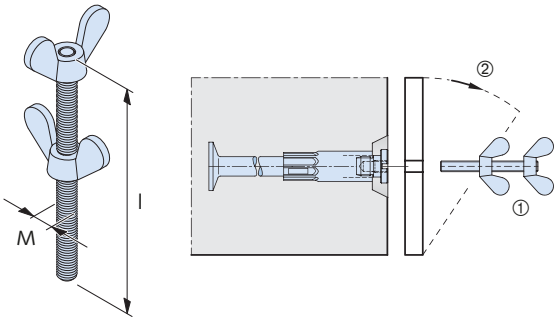



**Tool — steel nailing plate**

| Load class | Article name | Order no. 0741.350- | Rd | ø hole [mm] |
|---|---|---|---|---|
| 1,3–2,5 | 6337-12 / 16 | 00001 | 12–16 | 10.5 |
| 4,0–15,0 | 6337-20 / 52 | 00002 | 20–52 | 10.5 |

Facilitates loosening and removal of steel nailing plates.

### Retaining bolt S1




**Retaining bolt**

| Load class | Article name | Order no. 0073.060- | Thread | l [mm] |
|---|---|---|---|---|
| 4,0 –7,5 | S1-12 | 00002 | M 12 | 160 |
| 10,0 –15,0 | S1-16 | 00003 | M 16 | 160 |

The retaining bolt is used to attach the steel nailing plate. A butterfly bolt is crimped to one end to tighten the bolt; an additional butterfly bolt is used to secure the bolt to the formwork.

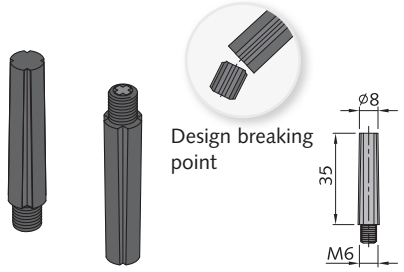
**Removing the formwork:**
① First remove all retaining bolts
② Then remove the side of the formwork

**Suitable retaining bolt:** see the nailing plate selection tables

# HALFEN HD SOCKET LIFTING SYSTEM
## Accessories

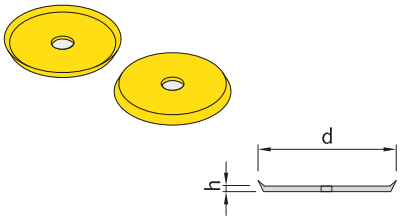
### Assembly pin, plastic

The assembly pin is used for quick removal of the formwork. The pin is screwed into the steel nailing plate with adapter. The assembly pin breaks off at the design breaking point when removing the formwork.



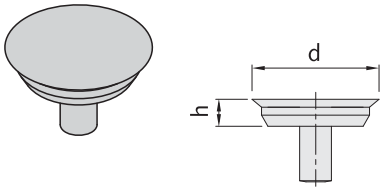

### Sealing plate, rubber

The rubber sealing plate is placed between the steel nailing plate and the formwork to prevent cement getting into the nailing plate holes when pouring the concrete. All sealing plates are coloured yellow.




### HD Sealing plate, plastic

The grey HD Sealing plate is used to seal recesses and conceal (and protect) the HD Anchors. Available for thread sizes Rd 12 to Rd 24.




**Assembly pin, plastic**

| Article name | Order no. 0741.300- | for load class |
|---|---|---|
| 6330-1,3-7,5 | 00001 | 1,3 |
| | | 2,5 |
| | | 4,0 |
| | | 5,0 |
| | | 7,5 |

**Sealing plate, rubber**

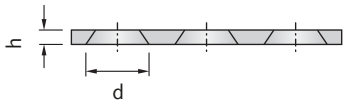
| Article name | Order no. 0741.330- | for load class | d [mm] | h [mm] |
|---|---|---|---|---|
| 6334-1,3-2,5 | 00001 | 1,3–2,5 | 40 | 1.5 |
| 6334-4,0-5,0 | 00002 | 4,0–5,0 | 55 | 1.5 |
| 6334-7,5-10,0 | 00003 | 7,5–10,0 | 70 | 1.5 |

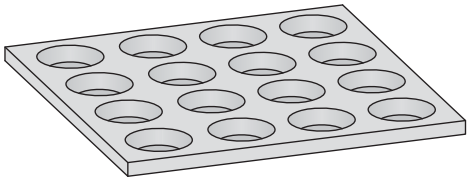
**HD Sealing plate, plastic**

| Article name | 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 |

### Mould

Mould for making the concrete recess plugs to fill the recesses made by the nailing plates. Rubber, re-usable.



**Rubber mould**

| Article name | Order no. 0741.290- | for load class | h [mm] | d [mm] | Number of plugs |
|---|---|---|---|---|---|
| 6329- 12-16 | 00001 | 1,3 + 2,5 | 8 | 37 | 16 |
| 6329- 20-24 | 00002 | 4,0 + 5,0 | 8 | 52 | 16 |
| 6329- 30-36 | 00003 | 7,5 + 10,0 | 8 | 67 | 16 |
| 6329- 42-52 | 00004 | 12,5 + 15,0 | 10 | 92 | 9 |

# HALFEN HD SOCKET LIFTING SYSTEM
## HD Lifting Devices

### General information

Health and safety regulations must always be observed.

Regulations covering the use of cranes and other lifting equipment apply.

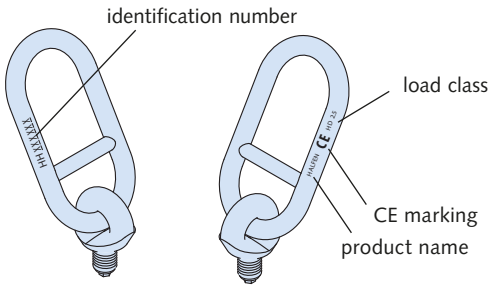
All HD Lifting links are identification marked.

### HD Lifting link

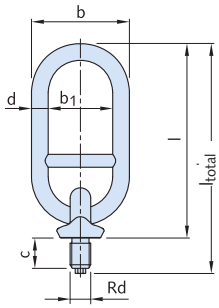
While the HD Anchor link is installed, the hexagon shaped tip of the ring bolt simultaneously turns the integrated thread protector.

When the HD Lifting link is removed the plastic thread cap returns to the top of the socket to protect the thread.

If the anchor was cast in using the nailing plate or the magnetic recess former then the shape of the final recess allows the HD lifting link to distribute shear or diagonal load more effectively into the concrete.




**Finish:** zinc plated




The threads must be checked regularly for damage. Recutting threads is not permitted.

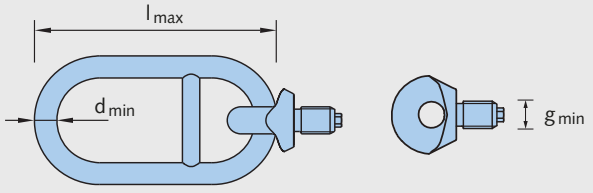
**Dimensions – HD Lifting links**

| Load class | | Article name | Order no. 0742.130- | Rd | weight [kg] | $l_{total}$ [mm] | l [mm] | c [mm] | b [mm] | $b_1$ [mm] | d [mm] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1,3 | 6362-12 | 00001 | 12 | 0.57 | 177.5 | 153 | 18.5 | 76 | 50 | 13 |
| | 2,5 | 6362-16 | 00002 | 16 | 0.65 | 182.5 | 153 | 23.5 | 76 | 50 | 13 |
| | 4,0 | 6362-20 | 00003 | 20 | 1.21 | 197.0 | 162 | 29.0 | 82 | 50 | 16 |
| | 5,0 | 6362-24 | 00004 | 24 | 1.29 | 203.0 | 162 | 35.0 | 82 | 50 | 16 |
| | 7,5 | 6362-30 | 00005 | 30 | 2.40 | 228.0 | 177 | 43.0 | 94 | 50 | 22 |
| | 10,0 | 6362-36 | 00006 | 36 | 2.54 | 236.5 | 177 | 51.5 | 94 | 50 | 22 |
| | 12,5 | 6362-42 | 00007 | 42 | 4.84 | 286.5 | 219 | 59.5 | 117 | 65 | 26 |
| | 15,0 | 6362-52 | 00008 | 52 | 5.31 | 299.5 | 219 | 72.5 | 117 | 65 | 26 |

Before each use check all lifting equipment for correct application and visually inspect to ensure damage-free condition!
**It is prohibited to use damaged lifting equipment!**

**HD Lifting links – wear limits**

| Load class | 1,3 | 2,5 | 4,0 | 5,0 | 7,5 | 10,0 | 12,5 | 15,0 |
|---|---|---|---|---|---|---|---|---|
| thread Rd | 12 | 16 | 20 | 24 | 30 | 36 | 42 | 52 |
| Link length: wear limits "l" [mm] | | | | | | | | |
| $l_{max}$ | 160 | 160 | 170 | 170 | 185 | 185 | 229 | 229 |
| Handle thickness: wear limits "d" [mm] | | | | | | | | |
| $d_{min}$ | 11.7 | 11.7 | 14.4 | 14.4 | 19.8 | 19.8 | 23.4 | 23.4 |
| Thread thickness: wear limits "g" [mm] | | | | | | | | |
| $g_{min}$ | 11.3 | 15.2 | 19.1 | 22.9 | 28.6 | 34.3 | 40.1 | 49.8 |



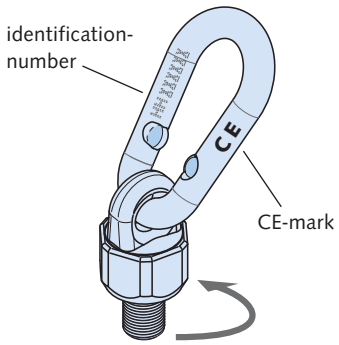

**Optional available certificates**
(please request when ordering)

- A certificate confirming that all guidelines and quality controlled manufacture were observed; also includes a certificate confirming the type of lifting link with an identification number and inspection table.
- In addition to the certificate a written report confirming the lifting link was tested to twice its nominal load capacity.

Please refer to the current price list for order numbers.

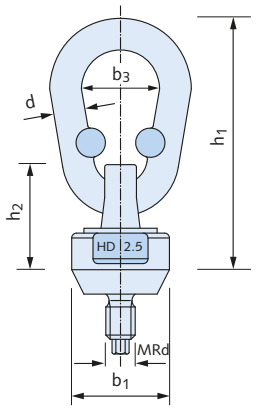
# HALFEN HD SOCKET LIFTING SYSTEM
## HD Lifting Devices

### HD Rotary head lifting link




**Application:** The HD Rotary head lifting link can be used for diagonal as well as for shear loads.

The rotatable head facilitates insertion into the anchor; the HD Rotary head link can be screwed into the HD Anchor while still attached to the crane hook.




**The 6367 Rotary head lifting link**

- forged spanner notches on the rotary link facilitate fitting /removal
- chrom (VI)-free galvanized coating provides up-to-date environmentally friendly corrosion protection
- large load surface ensures smooth rotation and turning; even under load
- link capable of pitching under diagonal load
- minimal height link size

Improved load transfer with a specially shaped load surface.

**Optional available certificates**

(please request when ordering)

- A certificate confirming that all guidelines and quality controlled manufacture were observed; also includes a certificate confirming the type of lifting link with an identification number and inspection table.
- In addition to the certificate a written report confirming the lifting link was tested to twice its nominal load capacity.

Please refer to the current price list for order numbers.

Before each use check all lifting equipment for correct application and visually inspect to ensure damage-free condition!
**It is prohibited to use damaged lifting equipment!**

**Dimensions – HD Rotary head lifting link**

| Load class | | Article name | Order no. 0742.230- | thread Rd | $b_1$ [mm] | $b_3$ [mm] | $h_1$ [mm] | $h_2$ [mm] | wrench [mm] | d [mm] |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1,3 | 6367-12 | 00001 | 12 | 40 | 32 | 100 | 25 | 34 | 13 |
| | 2,5 | 6367-16 | 00002 | 16 | 40 | 32 | 100 | 25 | 34 | 13 |
| | 4,0 | 6367-20 | 00003 | 20 | 55 | 34 | 126 | 28 | 46 | 16 |
| | 5,0 | 6367-24 | 00004 | 24 | 57 | 45 | 148 | 35 | 50 | 18 |
| | 7,5 | 6367-30 | 00005 | 30 | 70 | 46 | 163 | 41 | 65 | 20 |
| | 10,0 | 6367-36 | 00006 | 36 | 70 | 46 | 163 | 41 | 65 | 20 |
| | 12,5 | 6367-42 | 00007 | 42 | 95 | 60 | 201 | 48 | 75 | 23 |
| | 15,0 | 6367-52 | 00008 | 52 | 95 | 60 | 201 | 48 | 75 | 23 |
| | 25,0 | 6367-64 | 00009 | 64 | 110 | 70 | 246 | 59 | 95 | 30.5 |

## Application – rotary head lifting link

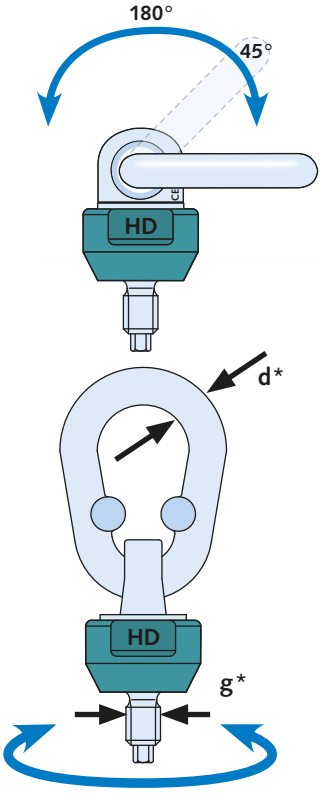
**Pitch limits**
Maximal angle of 45°
for diagonal load with cable spread or 90° in pitching.

**Note!** Reduced load capacity in shear load.

**Installation**
- forged spanner notches on the head allow easy fitting / removal
- crimp marks in the link prevent kinking
- galvanic coating protects against corrosion, this includes the inner parts of the link

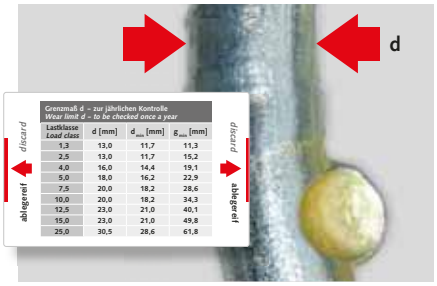
**Range of movement**
- 180° pivot
- 360° rotatable

**Additional safety**
- a failure safety factor of 4 applies for all load directions
- rotatable under load



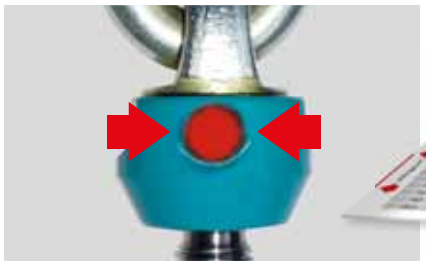
*(see table "wear limits")

**Checking the life-span**
Using the HALFEN Check-card the condition of the rotary head link is easily checked on-site (see table below) by checking the join-gap and the handle. If a HALFEN Check-card is not available a 0.5 mm thick piece of metal can be used instead.




**Discard the lifting clutch**
To determine if the lifting clutch must be discarded check the following: The joint in the rotary head lifting clutch, minimum thickness ($d_{min}$) of the lifting-bracket and the condition of the plug. (visual check of the colour security-mark).

Checking the condition of the clutch using the HALFEN Check-card.


**Check the colour security-mark on the plug.** The security-mark must not have any cracks.


**Check wear using the check-card/0.5 mm**
Discard anchor if the card can be inserted deeper than the red line (as illustrated).

## Load capacity – HD Rotary head lifting link

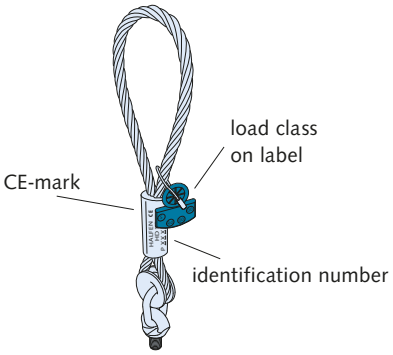
| Load class | Article name | Order no. 0742.230- | Centric load ① [kN] | Diagonal load ① ≤45° [kN] | Shear load ① [kN] |
|---|---|---|---|---|---|
| 1,3 | 6367-12 | 00001 | 13.0 | 13.0 | 7.5 |
| 2,5 | 6367-16 | 00002 | 25.0 | 25.0 | 14.0 |
| 4,0 | 6367-20 | 00003 | 40.0 | 40.0 | 22.5 |
| 5,0 | 6367-24 | 00004 | 50.0 | 50.0 | 28.0 |
| 7,5 | 6367-30 | 00005 | 75.0 | 75.0 | 42.5 |
| 10,0 | 6367-36 | 00006 | 100.0 | 100.0 | 57.0 |
| 12,5 | 6367-42 | 00007 | 125.0 | 125.0 | 71.0 |
| 15,0 | 6367-52 | 00008 | 150.0 | 150.0 | 85.5 |
| 25,0 | 6367-64 | 00009 | 250.0 | 250.0 | 130.0 |

① see pages 12-16 "Load directions"

## Wear limits – annual inspection

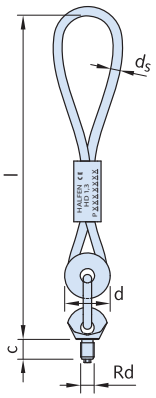
| Load class | d [mm] | $d_{min}$* [mm] | $g_{min}$* [mm] |
|---|---|---|---|
| 1,3 | 13.0 | 11.7 | 11.3 |
| 2,5 | 13.0 | 11.7 | 15.2 |
| 4,0 | 16.0 | 14.4 | 19.1 |
| 5,0 | 18.0 | 16.2 | 22.9 |
| 7,5 | 20.0 | 18.2 | 28.6 |
| 10,0 | 20.0 | 18.2 | 34.3 |
| 12,5 | 23.0 | 21.0 | 40.1 |
| 15,0 | 23.0 | 21.0 | 49.8 |
| 25,0 | 30.5 | 28.6 | 61.8 |

## HD Perfect head lifting link




**Application:** The HD Perfect head lifting link is especially suited for diagonal loads and is used for lifting wall elements upright with load angles under 90°: Observe the application instructions for HD Anchors!

**Optional available certificates:**
Please request when ordering and refer to the current price list for order numbers. → see pages 39 or 40 for further information.




**Dimensions — HD Perfect head lifting link**

| Load class | Article name | Order no. 0742.170- | Rd | weight [kg] | l [mm] | d [mm] | c [mm] | $d_s$ [mm] |
|---|---|---|---|---|---|---|---|---|
| 1,3 | 6377-12 | 00001 | 12 | 0.5 | 300 | 41 | 18.5 | 8 |
| 2,5 | 6377-16 | 00002 | 16 | 0.9 | 390 | 54 | 23.5 | 11 |
| 4,0 | 6377-20 | 00003 | 20 | 2.0 | 510 | 70 | 29.0 | 14 |
| 5,0 | 6377-24 | 00004 | 24 | 2.4 | 550 | 70 | 35.0 | 16 |
| 7,5 | 6377-30 | 00005 | 30 | 5.8 | 700 | 98 | 43.0 | 20 |
| 10,0 | 6377-36 | 00006 | 36 | 6.9 | 760 | 98 | 51.5 | 22 |
| 12,5 | 6377-42 | 00007 | 42 | 11.0 | 860 | 124 | 59.5 | 24 |
| 15,0 | 6377-52 | 00008 | 52 | 14.0 | 940 | 124 | 72.5 | 28 |

## Checking the cable loops

All lifting equipment, including cable loops must be checked by a qualified expert at least once a year to ensure safety. There is no predetermined limit on the life span of a cable. We can only guarantee the safety and function of the perfect head if original cable-loops are used. Bolt threads must be checked regularly for any signs of damage. Recutting threads is not permitted.

**Cables must be discarded if the following number of broken wires are visible:**

**Wire breaks**

| cable type | Visible wire breaks over a cable length of: | | |
|---|---|---|---|
| | 3d | 6d | 10d |
| strand cable | 4 | 6 | 16 |

Checking the cable loop must also include checking cable loop slip in the ferrule. Cables must not come into contact with acids, caustic solutions or other aggressive substances.

Cable loops are preferable hung in crane hooks with large cross sections. Crane hooks with sharp edges or with minimal cross sections and therefore small diameters may damage and cause cables to deteriorate faster, resulting in a shorter lifespan. Lifting clutches generally have a longer service life than cables, therefore, lifting clutches with cable loops that have been discarded can be returned to us to be repressed.

**Cable loops must be checked for following defects:**

- kinking
- breakage in a cable strand
- loosening of the exterior wires in the cable length
- compressive deformation
- crushing in the load area of the load loop with more than four wire breaks in strand-cables and more than ten breaks in wire-laid cables
- signs of corrosion
- excessive wear in the cable or cable-end connections
- a large number of broken wires

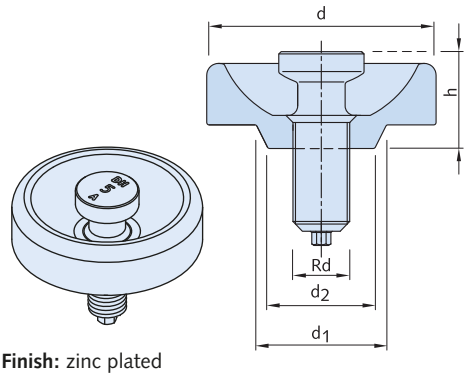
Before each use check all lifting equipment for correct application and visually inspect to ensure damage-free condition!
**It is prohibited to use damaged lifting equipment!**

**Checking the thread**
See HD Link chapter, table on page 39 (“HD Lifting links – wear limits”) see “$g_{min}$”.

# HALFEN HD SOCKET LIFTING SYSTEM
## HD Lifting Devices

### Adapter for HALFEN DEHA Universal head clutch

**Application:** The HD Adapter enables the HALFEN DEHA Spherical head lifting anchor system to be used with the HD Socket lifting system. The universal head lifting link of the appropriate load class can then be attached.

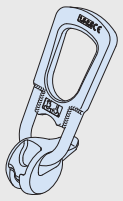



**Finish:** zinc plated

The 6366 adapter can only be used when the lifting anchor was installed in a precast concrete element using a nailing plate of 10 - 12 mm height. Using the adapter when a nailing plate with a height of 20 mm was used is not permitted.

**Dimensions — HD Adapter**

| Load class | Article name | Order no. 0742.140- | Rd | d [mm] | $d_1$ [mm] | $d_2$ [mm] | h [mm] | Suitable for the universal head clutch Article name |
|---|---|---|---|---|---|---|---|---|
| 1,3 | 6366-12 | 00001 | 12 | 70 | 40 | 30 | 30 | 6102- 1,3 |
| 2,5 | 6366-16 | 00002 | 16 | 78 | 40 | 30 | 38 | 6102- 2,5 |
| 4,0 | 6366-20 | 00003 | 20 | 97 | 55 | 45 | 45 | 6102- 5,0 |
| 5,0 | 6366-24 | 00004 | 24 | 97 | 55 | 45 | 45 | |
| 7,5 | 6366-30 | 00005 | 30 | 117 | 70 | 60 | 60 | 6102-10,0 |
| 10,0 | 6366-36 | 00006 | 36 | 117 | 70 | 60 | 60 | |
| 12,5 | 6366-42 | 00007 | 42 | 117 | 95 | 85 | 95 | 6102-20,0 |
| 15,0 | 6366-52 | 00008 | 52 | 117 | 95 | 85 | 95 | |



### Inspection procedure — HD Adapter

**Discard the HD Adapter if:**

- the bolt is bent or deformed in any way
- the thread is damaged or if there is any signs of cracks
- minimal head thickness and thread diameter have been exceeded due to excessive wear
- pressure plate wear has progressed so far that the universal head lifting link only has contact towards the top of the adapter-plate

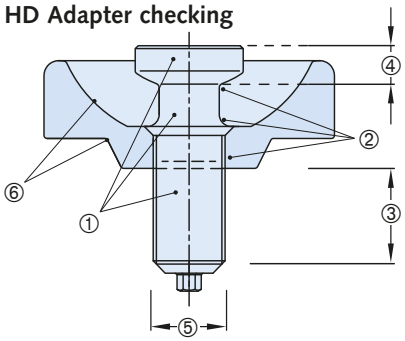
**Wear limits — HD Adapters**

| Load class | 1,3 | 2,5 | 4,0 | 5,0 | 7,5 | 10,0 | 12,5 | 15,0 |
|---|---|---|---|---|---|---|---|---|
| thread Rd | 12 | 16 | 20 | 24 | 30 | 36 | 42 | 52 |
| wear limit | | | | | | | | |
| minimum-thread-ø | 11.6 | 15.5 | 16.6 | 23.4 | 29.3 | 35.2 | 41.1 | 51.0 |
| minimum head thickness ④ [mm] | | | | | | | | |
| min. head thickness | 7.0 | 10.0 | 11.5 | 11.5 | 16.0 | 16.0 | 24.5 | 24.5 |

Before each use check all lifting equipment for correct application and visually inspect to ensure damage-free condition!

**It is prohibited to use damaged lifting equipment!**

**HD Adapter checking**




① Visual inspection for bending in the screw/thread and for other deformation (rebending the screw/thread is not permitted).

② Visual inspection of bolt for any signs of cracks.

③ Includes a visual inspection of the thread for any damage and atypical wear.

④ Check head thickness (see below).

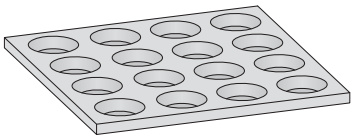
⑤ Check thread diameter.

⑥ Visual inspection of pressure plate for obvious wear.

# Installation of concrete recess plugs

## Sealing the nailing plate recess

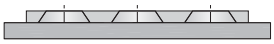
Recesses in precast balconies, stairs or other elements can be sealed with plastic or steel recess fillers. These however remain visible in the element. If an aesthetic finish is required recesses can be cast in concrete using the same material as in the main element.



> ⚠ The concrete recess fillers blend in to the surface of the precast concrete parts.

This provides a near uniform surface:

- in the same colouring
- in the same material
- with the same texture



**Making the recess fillers (fig. 8)**
To achieve the required structure, place the recess filler mould with the larger ring diameter facing down on the formwork and fill with concrete from the same batch as the concrete component.

A PU (Polyurethane) mould is available to make custom recess fillers in the precast plant; this ensures a visually optimal solution.

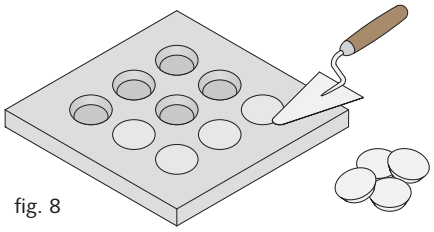


fig. 8

The concrete is then levelled off. Remove the mould once the concrete has hardened; the recess fillers can now be removed from the formwork and used.

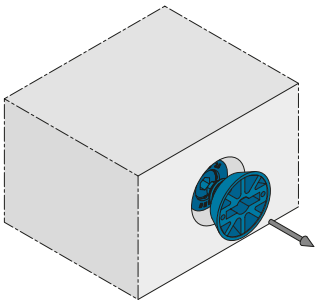


fig. 9

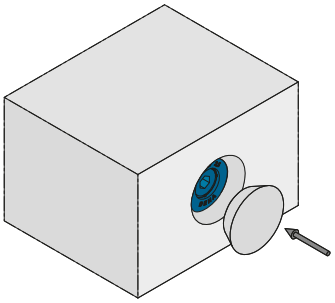


fig. 10

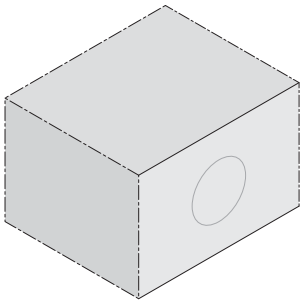


fig. 11

**Fixing the recess fillers (fig. 9 – 11)**
After final installation of the precast element the recess fillers can be cemented in place.

We recommend using commercially available quick-set mortar.

The moulds are reusable.

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