DEHA SOCKET ANCHOR SYSTEM
TECHNICAL PRODUCT INFORMATION

DEHA SOCKET ANCHOR LIFTING SYSTEM

CONCRETE

HA 18-E

This catalogue is an installation and application instruction as defined in VDI/BV-BS 6205.

HALFEN
YOUR BEST CONNECTIONS

Certified quality from HALFEN – Connected to safety.

HALFEN
YOUR BEST CONNECTIONS

MPA NRW.
Materialprüfungsamt Nordrhein-Westfalen
certified and surveyed
No. 11 7116

CE
VDI/BV-BS 6205

HALFEN Anchors meet the requirements of the European machine guideline (MD) 2006/42/EC. The required steel load capacity for lifting systems is defined in these guidelines.

To also ensure safe use of lifting anchor systems with the required resistance values for cast-in anchors, HALFEN Lifting anchor and lifting anchor systems also meet the requirements of VDI/BV-BS regulation 6205.

The regulation titled "Lifting inserts and lifting insert systems for precast concrete elements" represents up-to-date technological knowledge in this field.
HALFEN ensures a constant high standard of safety for its lifting anchors and systems by complying with the requirements set in these regulations.

To confirm conformity with MD 2006/42/EC in conjunction with the VDI/BV-BS 6205 all HALFEN Lifting anchor systems are CE marked.

This catalogue is an installation and application instruction as defined in VDI/BV-BS 6205.

To guarantee a high level of safety all HALFEN Anchors and anchor systems are subjected to regular self- and third-party quality control.

We guarantee continuous high quality and maximal safety for your company, your employees and your customers. This quality is ensured by external controlling and confirmed with the CE mark.

HALFEN = dependable

High ductility – high performance even in extreme situations

Specially tempered steel guarantees high elastic and plastic properties. The required unique steel composition to achieve product characteristics are specified by HALFEN. Numerous tests and many years of experience guarantee best possible results and highest confidence in all applications.

Increased dependable cold-toughness – same characteristics irrespective of environmental conditions

The special composition of the steel ensures constant identical characteristics (temperature independent).

Steel used by HALFEN exceeds the requirements of DIN EN 10025.

Quality control – safety in application

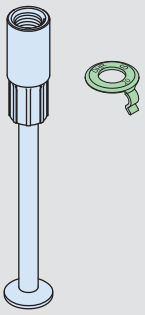
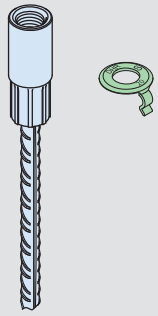
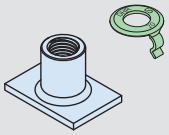
By specifying products and material, continual raw material, product monitoring and testing by renown independant bodies and universities, our customers are assured that the quality and properties of all HALFEN Anchors remain consistent.

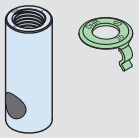
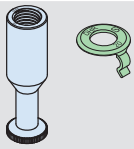
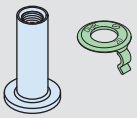
DEHA SOCKET ANCHOR SYSTEM

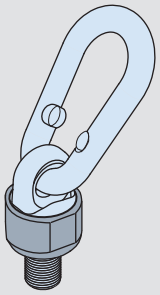
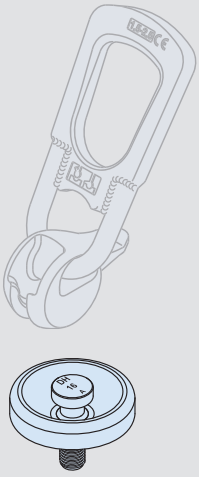
Contents

DEHA SOCKET ANCHOR SYSTEM

System Overview

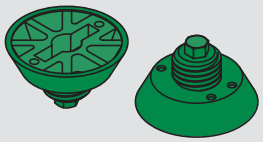
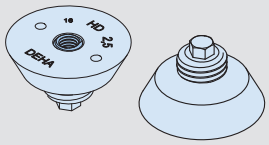
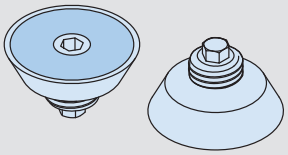
DEHA Anchors			
	Combi anchor	Rod anchor	Plate anchor
	6351 	6319 	6346 
Application	Used to lift a wide range of different format precast concrete elements	Used to lift especially thin precast elements; for example; precast garage walls	Used to lift large, thin precast slab elements that are lifted perpendicular to their main surface (slabs and shells)
Load class	0,5 – 12,5	0,5 – 12,5	0,5 – 6,3

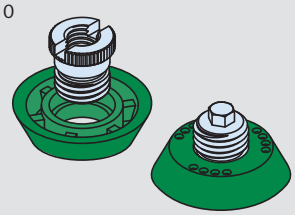
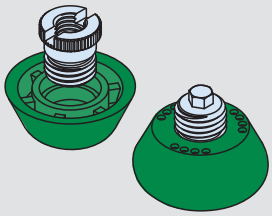
	Plain socket	Crown anchor	Short anchor
	6372 	6380 	6308 
Application	Used to lift thin precast walls or for use in low-strength concrete. Load transfer into the concrete is with hanger reinforcement inserted through the anchor hole	Used to lift precast slab elements; floor slabs and similar	Used to lift large precast thin slab elements (slabs and shells)
Load class	0,5 – 6,3	0,5	0,5

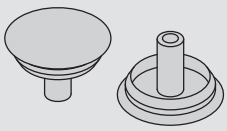
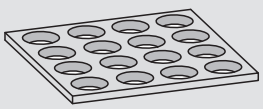
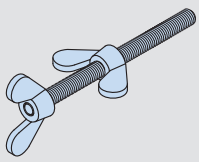
DEHA Lifting links				
	Lifting loop	Perfect lifting head	Rotary head	Adapter for the universal lifting head
	6311 	6377 	6367 	6366 
Application	The standard solution for lifting precast elements with cast-in socket anchors	Used to lift precast elements with cast-in socket anchors. Especially suitable for diagonal loading	Suitable for diagonal and shear loading. The rotatable head allows the clutch to be screwed in to the HD Anchor without turning the head	This adapter allows the sleeve anchor system to be used with the DEHA Spherical-head lifting system. The DEHA Universal head clutch can then be used for lifting
Load class	0,5 – 12,5	0,5 – 12,5	0,5 – 12,5	M/Rd 12 – 52

DEHA SOCKET ANCHOR SYSTEM

System Overview

DEHA Anchor accessories			
	Nailing plate — combi anchors	Nailing plate — steel	Nailing plate — steel core + magnet
	6358 	6369 	6365 
Material	Plastic	Steel	Steel
Application	Nailing plates are used to fix the socket anchor to formwork; used for the lifting loop (6311), DEHA Combi lifting head (6356), DEHA Perfect lifting head (6313), and the adapter (6366) for the Universal head lifting link (6102).		
M/Rd	12 – 52	12 – 52 (except 14, 18)	12 – 52 (except 14, 18)

	Nailing plate (10 mm) for combi anchors, steel core + replacement ring	Combi nailing plate (20 mm), steel core + replacement ring	Identification cap
	6510 	6520 	6357 
Material	Ring: plastic / Thread: steel	Ring: plastic / Thread: steel	Plastic
Application	Used to fix the socket anchor to the formwork when using the lifting loop (6311), DEHA Combi lifting head (6356), DEHA Perfect lifting head (6313) and the adapter (6366) for the Universal head lifting link (6102)	Used to fix the socket anchor to formwork when using the lifting loop (6311), DEHA Combi lifting head (6356), DEHA Perfect lifting head (6313)	Identifies the cast-in socket anchor. Also used to secure any additional reinforcement
M/Rd	12 – 52	12 – 52	Load class 0,5 – 12,5

	Sealing plugs	Sealing plates	Mould for the combi nailing plate	Retaining bolt S1
	6359 6315 	6513 	6329 	TPA-S1 
Material	Plastic	Plastic	Rubber	Steel
Application	Plugs protect the threads against dirt, soil etc.	Used to seal the anchor sockets as protection against dirt etc.; also for use in fair-faced concrete. Suitable for: 6358, 6369, 6365, 6510	Used to make concrete recess fillers	The bolt secures the steel nailing plate to the formwork
M/Rd	12 – 52	12, 16, 20, 24	All load classes	All load classes

DEHA SOCKET ANCHOR SYSTEM

Available Anchors

Combi anchor

Load class		Article name	Order no. 0740.010-
zinc plated	0,5	6351-0,5-100	00002
		6351-0,5-150	00003
	0,8	6351-0,8-075	00007
		6351-0,8-105	00005
		6351-0,8-155	00006
	1,2	6351-1,2-130	00009
		6351-1,2-175	00010
	1,6	6351-1,6-090	00015
		6351-1,6-150	00013
		6351-1,6-225	00014
	2,0	6351-2,0-100	00016
		6351-2,0-183	00017
		6351-2,0-250	00018
	2,5	6351-2,5-115	00020
		6351-2,5-200	00021
		6351-2,5-275	00022
	4,0	6351-4,0-144	00025
		6351-4,0-275	00026
		6351-4,0-345	00027
	6,3	6351-6,3-334	00029
	8,0	6351-8,0-385	00031
		6351-8,0-500	00032
	12,5	6351-12,5-550	00033
Load class		Article name	Order no. 0740.010-
stainless steel A4 socket ①	0,5	6351-0,5-100 A4	00036
	0,8	6351-0,8-075 A4	00050
		6351-0,8-105 A4	00038
	1,2	6351-1,2-075 A4	00039
		6351-1,2-130 A4	00040
	1,6	6351-1,6-090 A4	00051
		6351-1,6-150 A4	00041
	2,0	6351-2,0-183 A4	00042
	2,5	6351-2,5-200 A4	00044
	4,0	6351-4,0-275 A4	00046
	6,3	6351-6,3-334 A4	00047
	8,0	6351-8,0-385 A4	00048
	12,5	6351-12,5-550 A4	00049

① Base: steel, mill-finish

Rod anchor

Load class		Article name	Order no. 0740.030-
zinc plated	0,5	6319-0,5-190	00001
	0,8	6319-0,8-230	00003
	1,2	6319-1,2-270	00004
	1,6	6319-1,6-350	00006
	2,0	6319-2,0-350	00007
	2,5	6319-2,5-400	00010
		6319-2,5-450	00011
		6319-2,5-720	00018
	4,0	6319-4,0-540	00012
	6,3	6319-6,3-670	0013
	8,0	6319-8,0-780	00014
	12,5	6319-12,5-1100	00015
		6319-12,5-1290	00016
Load class		Stainless steel A4 socket ②	
		Article name	Order no. 0740.030-
0,5 – 12,5		on request	

② Bar: B500B (BSt 500 S)

Short anchor

Load class	zinc plated	
	Article name	Order no. 0740.060-
0,5	6308-0,5-050	00001
Load class	Stainless steel A4	
	Article name	Order no. 0740.060-
0,5	6308-0,5-050 A4	00014

Crown anchor

Load class		Article name	Order no. 0740.020-
zinc plated	0,5	6380-0,5-60	00001

Not available in stainless steel!

Plain anchor

Load class		Article name	Order no. 0740.040-
zinc plated	0,5	6372-12	00001
	0,8	6372-14	00002
	1,2	6372-16	00003
	1,6	6372-18	00004
	2,0	6372-20	00005
	2,5	6372-24	00006
	4,0	6372-30	00007
	6,3	6372-36	00008
Load class		Article name	Order no. 0740.040-
stainless steel A4	0,5	6372-12 A4	00009
	0,8	6372-14 A4	00016
	1,2	6372-16 A4	00011
	2,0	6372-20 A4	00013
	2,5	6372-24 A4	00014
	4,0	6372-30 A4	00015
	6,3	6372-36 A4	00017

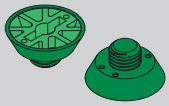
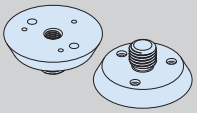
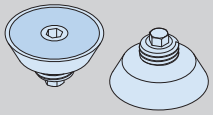
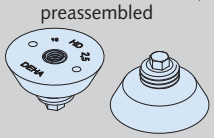
Plate anchor

Load class		Article name	Order no. 0740.050-
zinc plated	0,5	6346-12	00001
	0,8	6346-14	00002
	1,2	6346-16	00003
	1,6	6346-18	00004
	2,0	6346-20	00005
	2,5	6346-24	00006
	4,0	6346-30	00007
	6,3	6346-36	00015
Load class		Article name	Order no. 0740.050-
stainless steel A4	0,5	6346-12 A4	00008
	0,8	6346-14 A4	00009
	1,2	6346-16 A4	00010
	1,6	6346-18 A4	00011
	2,0	6346-20 A4	00012
	2,5	6346-24 A4	00013
	4,0	6346-30 A4	00014
	6,3	6346-36 A4	00016

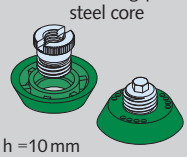
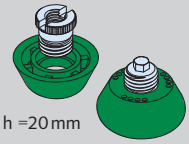
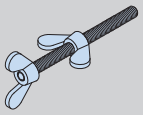
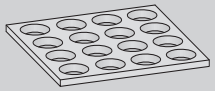
DEHA SOCKET ANCHOR SYSTEM

Accessories

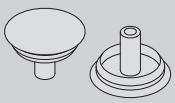
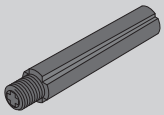
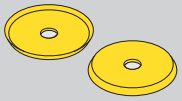
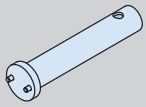
Socket anchor accessories

Load class	Combi nailing plate, plastic		Identification cap, plastic		Nailing plate, steel		Nailing plate, with magnet		Nailing plate, steel with thread reducer, preassembled	
										
	Article name	Order no. 0741.040-	Article name	Order no. 0741.110-	Article name	Order no. 0741.190-	Article name	Order no. 0741.180-	Article name	Order no. 0741.190-
0,5	6358-12	00001	6357-12	00001	6369-12	00001	6365-12	00001	-	-
0,8	6358-14	00002	6357-14	00002	-	-	-	-	-	-
1,2	6358-16	00003	6357-16	00003	6369-16	00002	6365-16	00002	6369-16	00102
1,6	6358-18	00004	6357-18	00004	-		-	-	-	-
2,0	6358-20	00005	6357-20	00005	6369-20	00003	6365-20	00003	6369-20	00103
2,5	6358-24	00006	6357-24	00006	6369-24	00004	6365-24	00004	6369-24	00104
4,0	6358-30	00007	6357-30	00007	6369-30	00005	6365-30	00005	6369-30	00105
6,3	6358-36	00008	6357-36	00008	6369-36	00006	6365-36	00006	-	-
8,0	6358-42	00009	6357-42	00009	6369-42	00007	6365-42	00007	-	-
12,5	6358-52	00010	6357-52	00010	6369-52	00008	6365-52	00008	-	-

Socket anchor accessories

Load class	Combi nailing plate, steel core		Replacement ring for 6510		Nailing plate, steel core		Replacement ring for 6520		Retaining bolt		Mould for the combi nailing plate	
	 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-
0,5	6510-12	00101	6512-12	00001	6520-12	00101	6522-12	00001	S1-08	00001	6329-12-16	00001
0,8	6510-14	00002	6512-14	00002	6520-14	00002	6522-14	00002				
1,2	6510-16	00103	6512-16	00003	6520-16	00103	6522-16	00003				
1,6	6510-18	00004	6512-18	00004	6520-18	00004	6522-18	00004	S1-12	00002	6329-18-24	00002
2,0	6510-20	00105	6512-20	00005	6520-20	00105	6522-20	00005				
2,5	6510-24	00106	6512-24	00006	6520-24	00106	6522-24	00006				
4,0	6510-30	00107	6512-30	00007	6520-30	00107	6522-30	00007			6329-30-36	00003
6,3	6510-36	00108	6512-36	00008	6520-36	00108	6522-36	00008				
8,0	6510-42	00109	6512-42	00009	6520-42	00109	6522-42	00009	S1-16	00003	6329-42-52	00004
12,5	6510-52	00110	6512-52	00010	6520-52	00110	6522-52	00010				

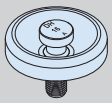
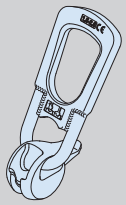
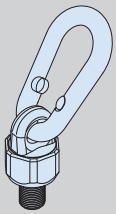
Socket anchor accessories

Load class	Sealing plate		Sealing plug		Sealing plug		HD-Assembly pin		Sealing plate, rubber (yellow)		Tool for nailing plates, steel	
												
	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-
0,5	6313-12	00001	6359-12	00001	6315-12	00001	6330-Rd 12–30 (except: Rd 14, Rd 18)	00001	6334-Rd 12–16	00001	6337-Rd 12–16	00001
0,8	-	-	6359-14	00002	6315-14	00002						
1,2	6313-16	00002	6359-16	00003	6315-16	00003						
1,6	-	-	6359-18	00004	6315-18	00004			6334-Rd 18–24	00002	6337-Rd 20–52	00002
2,0	6313-20	00003	6359-20	00005	6315-20	00005						
2,5	6313-24	00004	6359-24	00006	6315-24	00006						
4,0	-	-	6359-30	00007	6315-30	00007			6334-Rd 30–36	00003		
6,3	-	-	6359-36	00008	6315-36	00008						
8,0	-	-	6359-42	00009	6315-42	00009	-	-	-	-		
12,5	-	-	6359-52	00010	6315-52	00010	-	-				

DEHA SOCKET ANCHOR SYSTEM

Accessories

Lifting devices

Load class	Lifting loop		Perfect head		Adapter		Universal head lifting link		Rotary head lifting clutch	
										
	Article name	Order no. 0742.040-	Article name	Order no. 0742.	Article name	Order no. 0742.	Article name	Order no. 0738.010-	Article name	Order no. 0742.230-
0,5	6311-12	00001	6377-12	170-00001	6366-12	140-00001	6102-1,0/1,3	00001	6367-12	00001
0,8	6311-14	00002	6313-14	060-00002	6303-14	090-00002	6102-1,5/2,5	00002	–	–
1,2	6311-16	00003	6377-16	170-00002	6366-16	140-00002			6367-16	00002
1,6	6311-18	00004	6313-18	060-00004	6303-18	090-00004			–	–
2,0	6311-20	00005	6377-20	170-00003	6366-20	140-00003	6102-3,0/5,0	00003	6367-20	00003
2,5	6311-24	00006	6377-24	170-00004	6366-24	140-00004			6367-24	00004
4,0	6311-30	00007	6377-30	170-00005	6366-30	140-00005	6102-6/10	00004	6367-30	00005
6,3	6311-36	00008	6377-36	170-00006	6366-36	140-00006			6367-36	00006
8,0	6311-42	00009	6377-42	170-00007	6366-42	140-00007	6102-12/20	00005	6367-42	00007
12,5	6311-52	00010	6377-52	170-00008	6366-52	140-00008			6367-52	00008

Load classes – colour codes

Each load class is defined with a specific, fixed designation. There are two load classes: The **standard load classes** and the **increased load classes.**

The **standard load classes** are identified with bright colours. The **increased load classes** are identified with dark colours.

Standard load class

Colour	Load class	Thread M/Rd
pink	0,5	12
yellow	0,8	14
white	1,2	16
black	1,6	18
light green	2,0	20
light blue	2,5	24
lilac	4,0	30
yellow	6,3	36
light brown	8,0	42
dark grey	12,5	52

Increased load class (see HALFEN HD-Anchor catalogue)

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

Safety regulations

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

The basic principles for calculating and using lifting anchors are described in the VDI/BV-BS 6205 guidelines. The guidelines are generally accepted as representing up-to-date technology.

The regulations require the following safety factors:

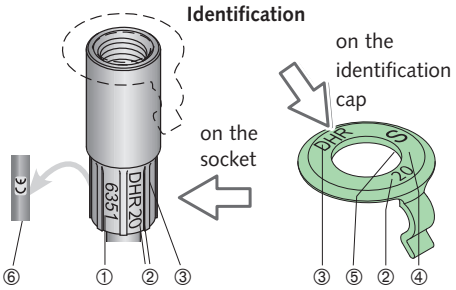
Safety against failure	
Steel failure of anchors:	$\gamma = 3.0$
Concrete failure*:	$\gamma = 2.5$
Breakage of lifting link:	$\gamma = 4.0$

* A safety factor of $\gamma = 2.1$ can be assumed for lifting anchors installed in a continuously supervised factory environment.

To ensure safe application of the DEHA Anchor system, these installation and application instructions must always be available at the place of use.

Identification

All lifting anchors and attachment links must be clearly labelled and easily identified by the user. According to the guideline "Lifting inserts and lifting insert systems for precast concrete elements" *(Transportanker und Transportankersysteme für Betonfertigteile)*, published by the VDI/BV-BS the identification markings should remain visible after installation.



① Article name, example: 6351
② Thread size
③ DHR = HALFEN identification
④ Colour identifies the load class
⑤ Type S = for lifting with:
- rotary head lifting clutch
- perfect head
- lifting loop
- adapter and universal head lifting link

⑥ CE marking

Installation and application

The DEHA Socket anchor system must be installed according to the following technical instructions.

Lifting anchors - stainless steel

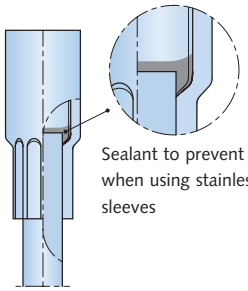
Repeated use of a lifting anchor is not permitted. Multiple lifting within one transport-chain from production to final installation of an element is not regarded as repeated use and is therefore allowed. In accordance with approval no. Z-30.3-6 the socket sleeves for lifting anchors for permanent use (in crane ballast, stop log gates etc.) must be made of stainless steel.

Lifting anchors that have been incorrectly installed or show signs of damage, for example: damage from corrosion or other visible deformation are not to be used for lifting.

The installation and application instructions for each lifting system must be readily available on site, in the precast plant or on the construction site.

The plant or site manager must ensure that the operator has read and understood the installation and assembly instructions for this system.

Sealing



Quality control

All lifting anchors and systems are quality controlled internally as well as in accordance with DIN EN ISO 9001.

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:

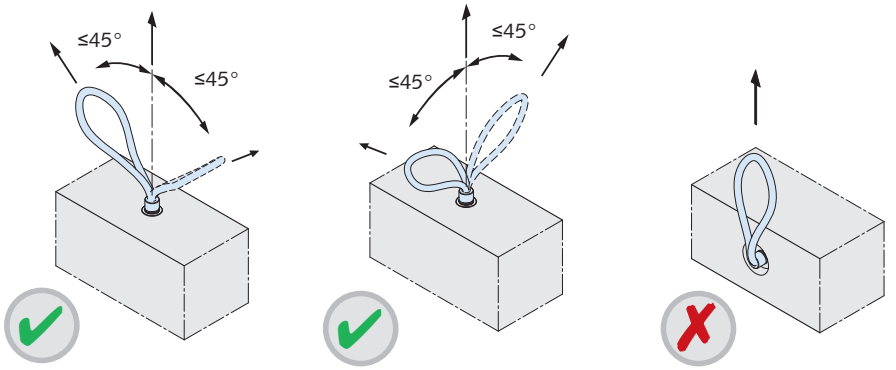
- weight of the precast element
- number of anchors
- anchor layout
- number of load bearing anchors
- spread angle in the hoist
- diagonal load properties of the anchor
- dynamic loads
- adhesion to the formwork

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

Application of the attachment links

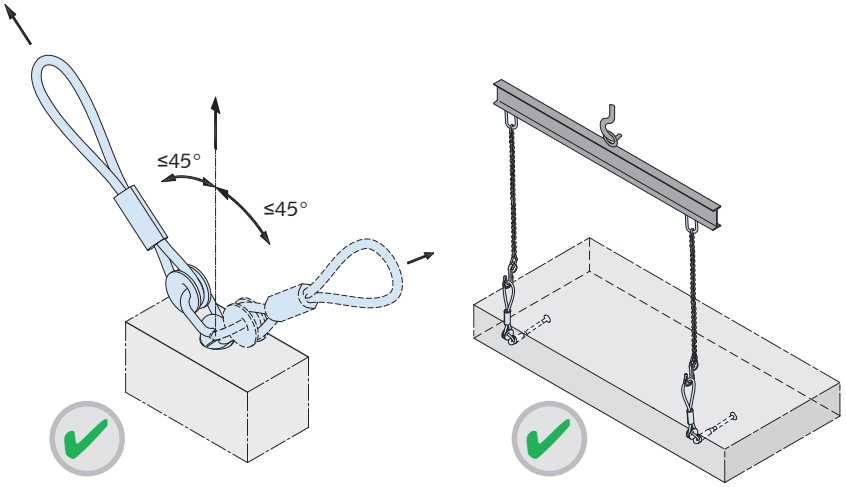
Threaded lifting loop

DEHA Lifting loops can be used for axial and diagonal load up to 45° in all directions. The lifting loop cannot be subjected to shear load.



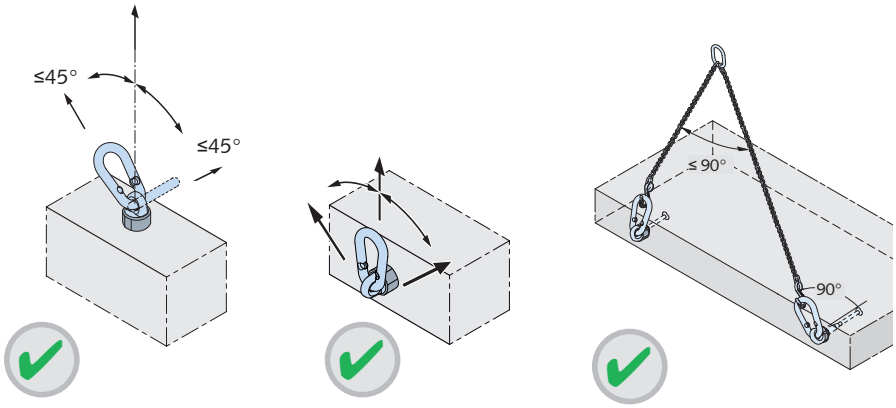
Perfect lifting head

The perfect lifting head can be used for all load directions. To ensure the ring bolt is not subject to shear load the bolt can be unscrewed half a turn. The perfect head must not be exposed to acids, alkalis and other aggressive substances that may cause corrosion. Modifications to the perfect head are not permitted, this includes recutting the thread and welding.



Rotary head clutch

The rotary head clutch can be used for diagonal and for shear load. The design of the rotary head allows it to be easily screwed into the HA-Anchor without turning the handle of the clutch.



Using lifting devices with eye bolts

Optimum load transfer is only ensured if the eye bolt is orientated in load direction as shown in **figure 1.** Subjecting the eye bolt to diagonal or shear load as shown in **figure 2** is not permitted.

The recess made in the concrete by the nailing plate matches the shape of the **perfect head** and the **rotary head clutch** exactly.

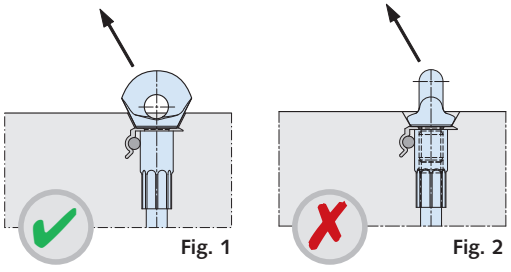


Fig. 1 Fig. 2

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 evenly amongst all anchors (for example; with a spreader beam).

Load capacities

The load capacity of the system depends on:

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

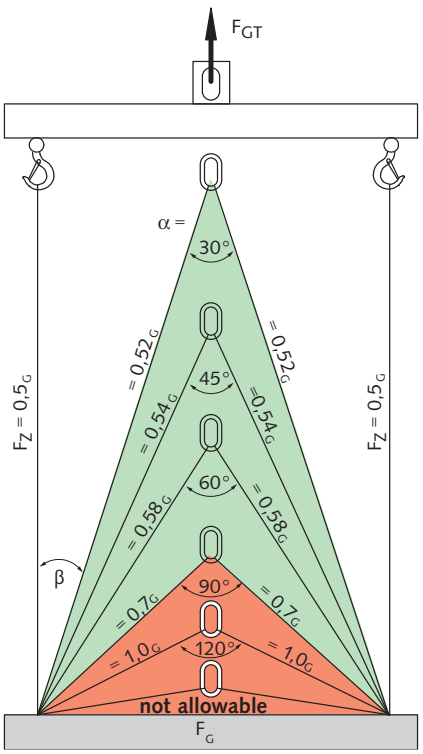
Dynamic forces

The effect of dynamic loading depends largely on the type of hoist selected between the crane and the load lifting head. Hoisting cables made of steel or synthetic fibre have a damping effect. With increasing cable length the damping effect is also increased; however, short chains have an adverse effect. The forces acting on the lifting anchor should be calculated using the dynamic factors ψ_{dyn}.

Total load on the anchor

Spread angle factors

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



In general the tensile force F_Z acting on the anchor is determined using the following equation:

Removing from the formwork

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

or

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

Lifting

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

Abbreviations:

F_Z = tension force on the anchor [kN]

F_G = weight of precast element [kN] (acc. to DIN EN 1991-1-1 specific weight of γ = 25 kN/m³)

A_f = contact surface between the concrete and formwork [m²]

n = number of load bearing anchors

z = diagonal load factor, z = 1/cos β

ψ_{dyn} = dynamic factor

q_{adh} = base value for formwork adhesion

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

■ This spread angle is not permitted for cable spread!

Dynamic-factors ψ_{dyn}*

Lifting unit	Shock factors ψ_{dyn}*
Stationary crane, swing-boom crane, 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 ψ_{dyn}, then these may be used for calculation.
With lifting situations other than listed the factor ψ_{dyn} is determined through tests or values based on previous experience.

Load directions

Definition of load directons:

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

Adhesion to the formwork

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

Adhesion to the formwork	
Lubricated steel formwork	q ≥ 1 kN/m²
Varnished timber formwork	q ≥ 2 kN/m²
Untreated formwork	q ≥ 3 kN/m²

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

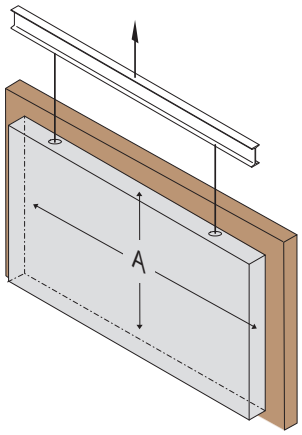
$$F_{adh} = q_{adh} \times A_f \text{ ①}$$

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

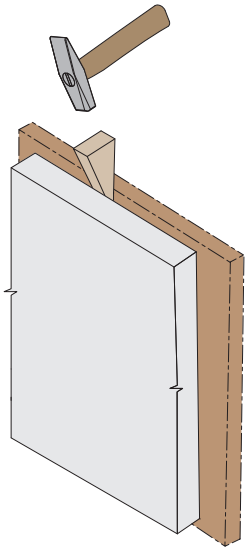
Increased adhesion must be assummed for π - panel and coffered ceiling slabs. A multiple of the dead weight is used to simplify calculation.

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.



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

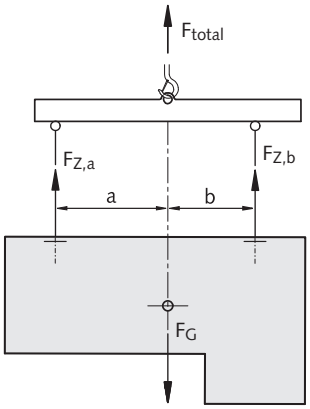


Use a wedge to carefully prise difficult to remove formwork from hardened concrete.

Anchor positioned asymmetrically

The load in each anchor is calculated using bar statics if the anchors are not installed symmetrically to the load's 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:

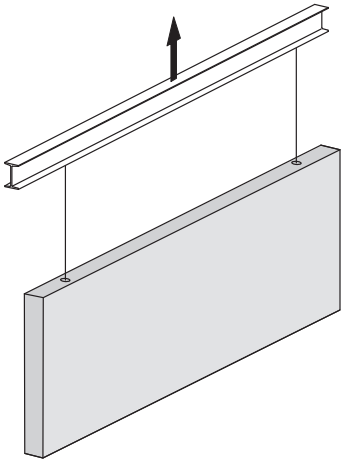
$$F_{Z,a} = F_G \times b / (a + b)$$

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

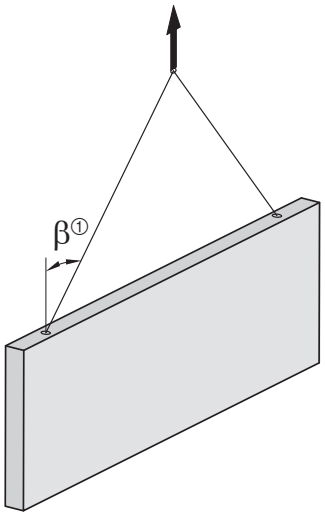
Note: To avoid precast elements hanging at a slant when being moved the hook in the spreader beam should be directly above the centre of gravity. If lifting elements without a spreader beam then the lifting anchors should be installed symmetrically to the centre of gravity.

Tensile loads at the anchors

Axial load β: 0° to 10°

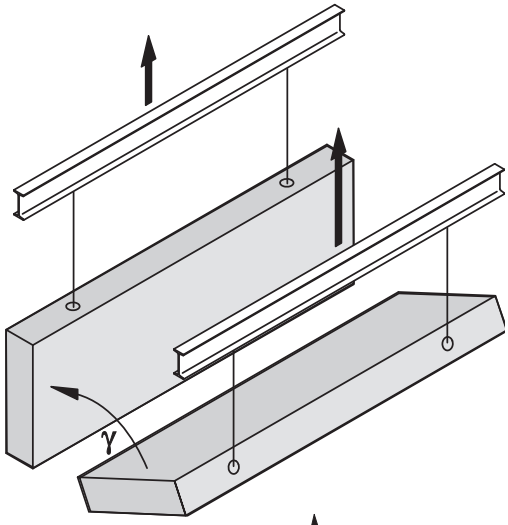


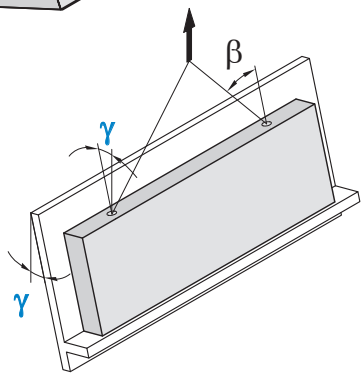
Diagonal load β: 10° to 60° ①



① Not recommended for angles > 45°

Tilting γ: 90°

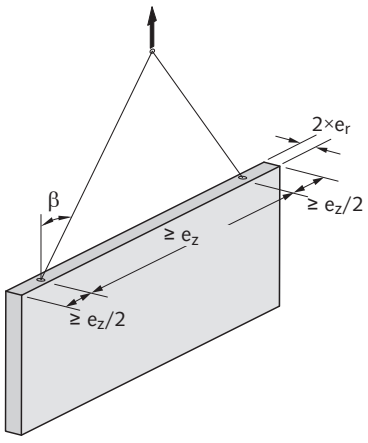




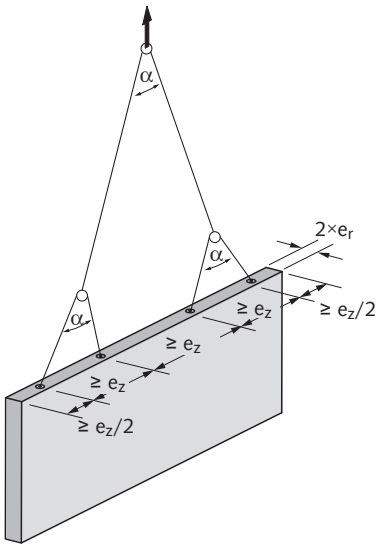
Additional shear reinforcement can be omitted when using a tilting table and a load angle of γ < 15°.

Static system

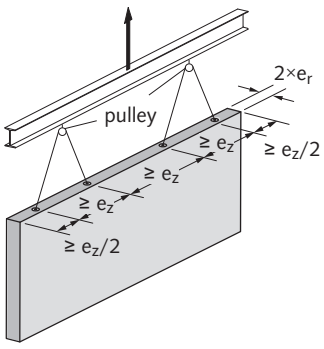
Positioning of anchors in walls



Assumed number of load bearing anchors: n = 2



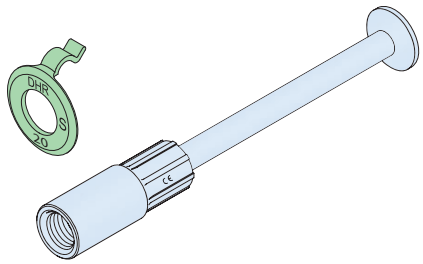
Assumed number of load bearing anchors: n = 4

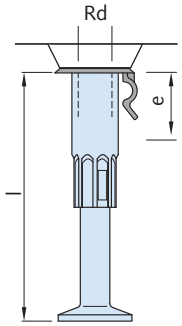


Assumed number of load bearing anchors: n = 4

Lifting Anchors

DEHA Combi anchor





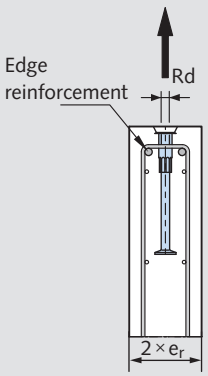
The combi anchor can be used to lift various sizes of precast reinforced concrete elements. Elements with minimal dimensions are easily lifted with the combi anchor, for example; thin façade panels (load bearing façade panels), beams and columns.

Dimensions and installation values

Load class		Zinc plated		Sleeve stainless steel A4		Thread Rd	l [mm]	e [mm]
		Article name	Order no. 0740.010-	Article name	Order no. 0740.010-			
	0,5	6351-0,5-100	00002	6351-0,5-100 A4	00036	12	100	31
		6351-0,5-150	00003	-	-		150	
	0,8	6351-0,8-075	00007	6351-0,8-075 A4	00050	14	75	25
		6351-0,8-105	00005	6351-0,8-105 A4	00038		105	
		6351-0,8-155	00006	-	-		155	
	1,2	-	-	6351-1,2-075 A4	00039	16	75	36
		6351-1,2-130	00009	6351-1,2-130 A4	00040		130	
		6351-1,2-175	00010	-	-		175	
	1,6	6351-1,6-090	00015	6351-1,6-090 A4	00051	18	090	31
		6351-1,6-150	00013	6351-1,6-150 A4	00041		150	
		6351-1,6-225	00014	-	-		225	
	2,0	6351-2,0-100	00016	-	-	20	100	42
		6351-2,0-183	00017	6351-2,0-183 A4	00042		183	
		6351-2,0-250	00018	-	-		250	
	2,5	6351-2,5-115	00020	-	-	24	115	48
		6351-2,5-200	00021	6351-2,5-200 A4	00044		200	
		6351-2,5-275	00022	-	-		275	
	4,0	6351-4,0-144	00025	-	-	30	144	58
		6351-4,0-275	00026	6351-4,0-275 A4	00046		275	
		6351-4,0-345	00027	-	-		350	
	6,3	6351-6,3-334	00029	6351-6,3-334 A4	00047	36	334	66
	8,0	6351-8,0-385	00031	6351-8,0-385 A4	00048	42	385	75
		6351-8,0-500	00032	-	-		500	
	12,5	6351-12,5-550	00033	6351-12,5-550 A4	00049	52	550	89

Reinforcement and load capacity – axial load

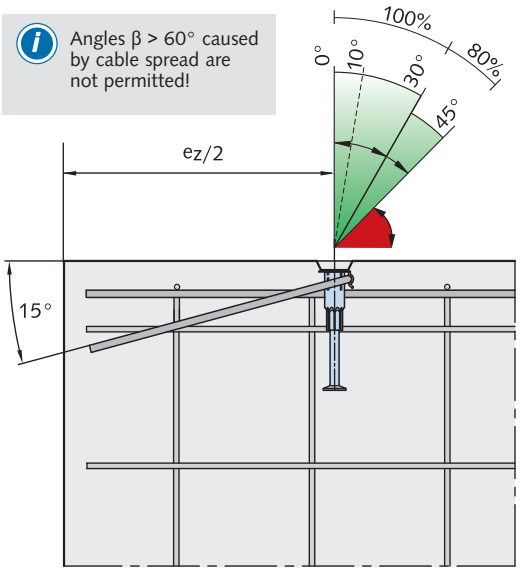
Load class		Article name	Thread Rd	min. thickness $2 \times e_r$ [mm]	Main reinforcement mesh [mm²/m]	Edge reinforcement [mm]	Axial load up to 10° Load capacity [kN] at concrete strength f_{ci} 15 N/mm²	25 N/mm²	Anchor spacing e_z [mm]
	0,5	6351-0,5-100	12	60	131	Ø8	5.0	5.0	300
	0,8	6351-0,8-105	14	60	131	Ø8	7.1	8.0	300
				70	131	Ø8	8.0	8.0	300
	1,2	6351-1,2-130	16	70	131	Ø8	10.9	12.0	400
				80	2 × 131	2 × Ø8	12.0	12.0	400
	1,6	6351-1,6-150	18	80	2 × 131	2 × Ø10	16.0	16.0	450
	2,0	6351-2,0-183	20	80	2 × 131	2 × Ø10	16.9	20.0	500
				100	2 × 131	2 × Ø10	20.0	20.0	500
	2,5	6351-2,5-200	24	100	2 × 131	2 × Ø10	25.0	25.0	600
	4,0	6351-4,0-275	30	120	2 × 188	2 × Ø12	40.0	40.0	700
	6,3	6351-6,3-334	36	140	2 × 188	2 × Ø12	55.7	63.0	800
				160			63.0	63.0	800
	8,0	6351-8,0-385	42	160	2 × 188	2 × Ø12	70.5	72.8	900
				180			77.0	80.0	900
				200			80.0	80.0	900
	12,5	6351-12,5-550	52	200	2 × 188	2 × Ø12	125.0	125.0	1100

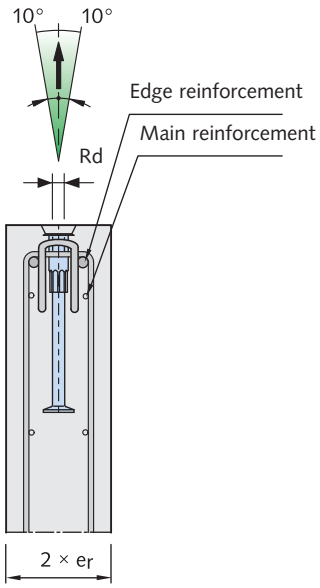


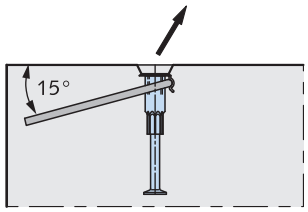
f_{ci} = cube concrete strength at time of lifting

DEHA Combi anchor

Angles β > 60° caused by cable spread are not permitted!

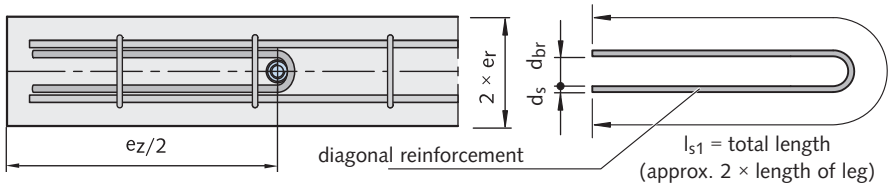






Always install diagonal rebar opposite the direction of the load

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



The bending roll diameter according to EC 2 may be disregarded.

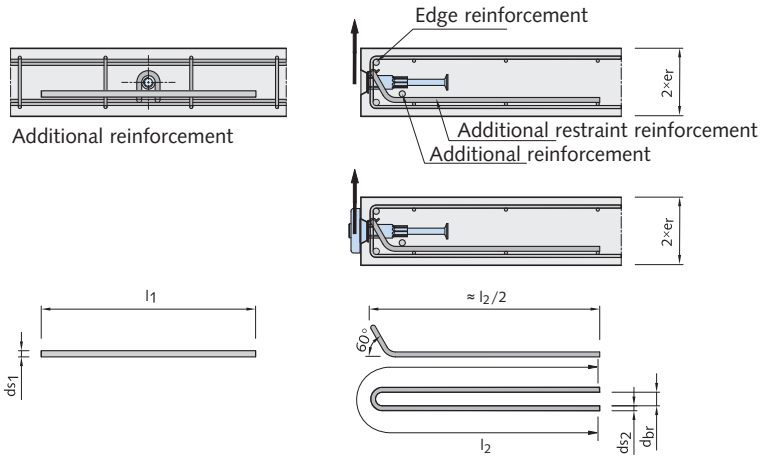
Reinforcement and load capacity for diagonal load up to 45°

Load class		Article-name	Thread	Minimum element thickness 2 × e_r	Main reinforcement mesh	Edge reinforcement	diagonal load up to 45°					Anchor spacings
							Additional reinforcement			Load capacity [kN] for concrete strength f_{ci}		
							d_s	d_{br}	l_{s1} elongated length ① ②			e_z
			Rd	[mm]	[mm²/m]	[mm]	[mm]	[mm]	[mm]	15 N/mm²	25 N/mm²	[mm]
	0,5	6351-0,5-100	12	60	1 × 188	Ø8	6	30	320	4.0	5.0	
	0,8	6351-0,8-105	14	60	1 × 188	Ø8	8	30	430	5.7	8.0	300
				70	1 × 188	Ø8	8	30	430	6.4	8.0	
	1,2	6351-1,2-130	16	70	1 × 257	Ø8	8	30	640	8.7	11.2	400
				80	2 × 131	2 × Ø8	8	30	640	9.6	12.0	
	1,6	6351-1,6-150	18	80	2 × 188	2 × Ø10	10	40	640	12.8	16.0	450
	2,0	6351-2,0-183	20	80	2 × 188	2 × Ø10	10	40	840	15.5	20.0	500
				100						16.0	20.0	
	2,5	6351-2,5-200	24	100	2 × 188	2 × Ø12	10	40	1050	20.0	25.0	600
	4,0	6351-4,0-275	30	120	2 × 188	2 × Ø12	12	50	1260	32.0	40.0	700
	6,3	6351-6,3-334	36	140	2 × 188	2 × Ø12	16	60	1600	44.6	63.0	800
				160						50.4	63.0	
	8,0	6351-8,0-385	42	160	2 × 188	2 × Ø12	20	80	2000	56.4	72.8	900
				180						61.6	80.0	
				200						64.0	80.0	
	12,5	6351-12,5-550	52	200	2 × 188	2 × Ø14	20	80	2000	100.0	116.3	1100
				220							125.0	

① According to EC 2, reducing the length of the rebar by bending is permitted.
② With diagonal loads = 10°< β ≤ 30° the lengths can be reduced by around 25%. f_{ci} = cube concrete strength at time of lifting

Lifting Anchors

DEHA Combi anchor



Using anchor loops for shear loads is not permitted.

The restraint reinforcement must be installed in direct contact with the socket.

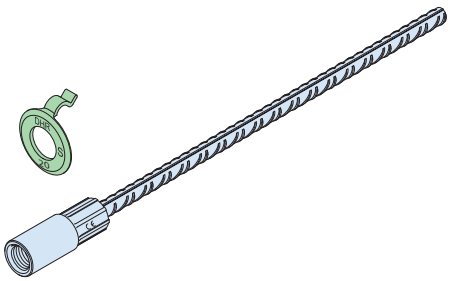
The bending roll diameter according to EC 2 may be disregarded. Longer anchor lengths do not result in increased capacity in shear load.

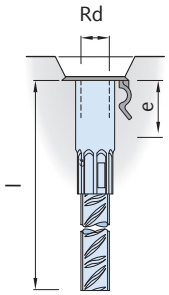
Reinforcement and load capacity for shear load up to 90° (tilting)

Load class		Article name	Thread	min. unit thickness 2 × e_r	Main reinforcement	Edge reinforcement	Shear load					Load capacity in [kN] at concrete compression strength f_{ci} ①	
							Additional reinforcement		Additional restraint reinforcement				
							d_{s1}	l_1	d_{s2}	d_{br}	l_2 (elongated length)		
			Rd	[mm]	[mm²/m]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	15 N/mm²	25 N/mm²
	0,5	6351-0,5-100	12	60	188	Ø8	8	500	8	30	650	2.5	2.5
				80	2 × 131	2 × Ø8						5.0	5.0
	0,8	6351-0,8-105	14	60	188	Ø8	8	500	8	30	650	3.4	4.3
				80	2 × 131	2 × Ø8						5.8	7.5
				100	2 × 131							8.0	8.0
	1,2	6351-1,2-130	16	70	257	Ø8	8	500	8	30	1050	4.8	6.0
				80	2 × 131	2 × Ø8						6.3	8.1
				100	2 × 131							8.8	11.4
				120	2 × 131							11.4	12.0
	1,6	6351-1,6-150	18	80	2 × 188	2 × Ø10	10	500	10	40	1050	5.3	6.9
				100								9.1	11.7
				120								12.0	15.5
				140								15.1	16.0
	2,0	6351-2,0-183	20	80	2 × 188	2 × Ø10	10	500	10	40	1050	5.9	7.6
				100								9.8	12.6
				120								12.9	16.6
				140								15.8	20.0
	2,5	6351-2,5-200	24	100	2 × 188	2 × Ø12	12	500	12	50	1050	8.6	11.1
				120								13.1	16.9
				140								16.5	21.3
				160								20.2	25.0
	4,0	6351-4,0-275	30	120	2 × 188	2 × Ø12	12	500	14	60	1700	13.7	17.7
				140								17.2	22.2
				160								21.0	27.1
	6,3	6351-6,3-334	36	140	2 × 188	2 × Ø12	12	500	16	60	1700	17.6	22.7
				160								21.5	27.8
				180								25.6	33.0
				200								30.6	39.5
	8,0	6351-8,0-385	42	160	2 × 188	2 × Ø12	16	500	16	60	1700	22.3	28.8
				180								26.6	34.3
				200								31.1	40.1
				220								36.0	46.5
	12,5	6351-12,5-550	52	200	2 × 188	2 × Ø14	16	500	20	120	2200	34.1	44.0
				220								39.3	50.7
				240								44.8	57.8
				260								50.5	65.2
				280								56.5	72.9

① Only for applications with the DEHA Combi head, perfect head or adapter. f_{ci} = concrete cube strength at time of lifting

DEHA Rod anchor





The DEHA Rod anchor is used to lift wall elements that have minimal thickness, reinforced concrete beams, or prefab garages. Prefab masonry elements can also be lifted using the DEHA Rod anchor.
The DEHA Rod anchor has a ribbed concrete reinforcement steel bar and a pressed sleeve with a Rd-thread.

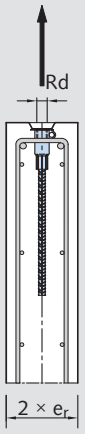
Dimensions

Load class		Zinc plated: Article name	Zinc plated: Order no. 0740.030-	Sleeve stainless steel A4: Article name	Sleeve stainless steel A4: Order no. 0740.009-	Thread Rd	l [mm]	e [mm]
	0,5	6319-0,5-190	00001	on request		12 ①	190	31
	0,8	6319-0,8-230	00003			14	230	25
	1,2	6319-1,2-270	00004			16 ①	270	36
	1,6	6319-1,6-350	00006			18	350	33
	2,0	6319-2,0-350	00007			20 ①	350	42
	2,5	6319-2,5-400	00010			24	400	48
		6319-2,5-450	00011				450	
		6319-2,5-720	00018				720	
	4,0	6319-4,0-540	00012			30	540	58
	6,3	6319-6,3-670	00013			36	670	66
	8,0	6319-8,0-780	00014			42	780	75
	12,5	6319-12,5-1100	00015			52	1100	89
		6319-12,5-1290	00016				1290	

① Thread-sleeves in S355 and also thread-sleeves with smaller diameter in S460 are available for these threads. Delivery subject to confirmation.

Reinforcement and load capacity — axial load up to 10°

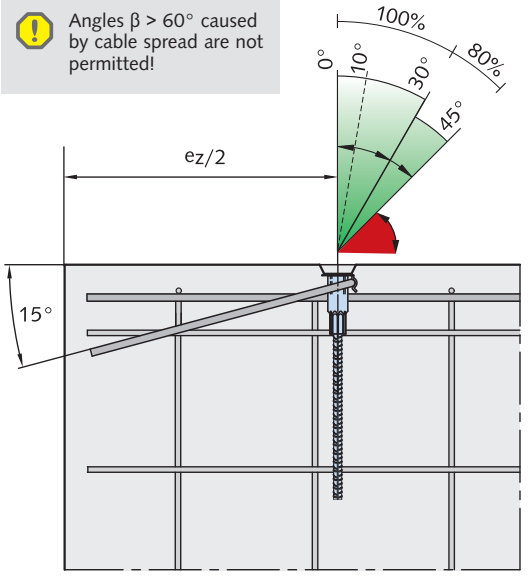
Load class		Article name	Thread Rd	min. unit thickness 2 × e_r [mm]	Main reinforcement mesh [mm²/m]	Edge reinforcement [mm]	Load capacity [kN] at concrete compression strength f_{ci}: 15 N/mm²	25 N/mm²	Axial spacing e_z [mm]
	0,5	6319-0,5-190	12	60	1 × 188	Ø8	5.0	5.0	400
	0,8	6319-0,8-230	14	60	1 × 188	Ø8	8.0	8.0	500
	1,2	6319-1,2-270	16	80	2 × 131	2 × Ø8	12.0	12.0	540
	1,6	6319-1,6-350	18	80	2 × 188	2 × Ø10	13.5	16.0	640
				100			16.0		
	2,0	6319-2,0-350	20	80	2 × 188	2 × Ø10	16.9	20.0	700
				100			20.0		
	2,5	6319-2,5-400	24	100	2 × 188	2 × Ø12	25.0	25.0	1000
	4,0	6319-4,0-540	30	100	2 × 188	2 × Ø12	31.4	40.0	1080
				120			40.0		
	6,3	6319-6,3-670	36	120	2 × 188	2 × Ø12	51.3	63.0	1340
				140			63.0		
	8,0	6319-8,0-780	42	140	2 × 188	2 × Ø14	67.0	80.0	1560
				160			80.0		
	12,5	6319-12,5-1100	52	150	2 × 188	2 × Ø14	98.0	125.0	2200
				180			125.0		

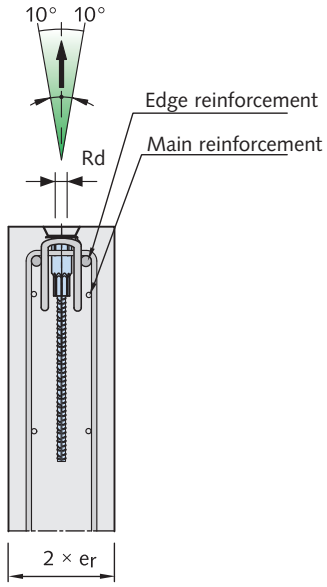


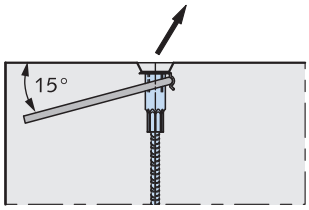
f_{ci} = concrete cube strength at time of lifting

DEHA Rod anchor

Angles β > 60° caused by cable spread are not permitted!

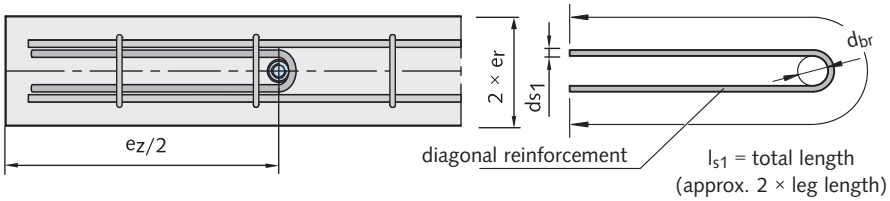






Always install diagonal reinforcement opposite the load direction

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



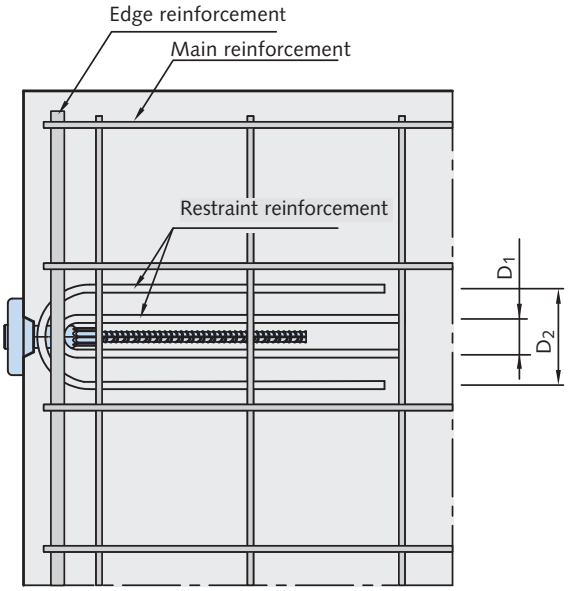
The bending roll diameter according to EC 2 may be disregarded.

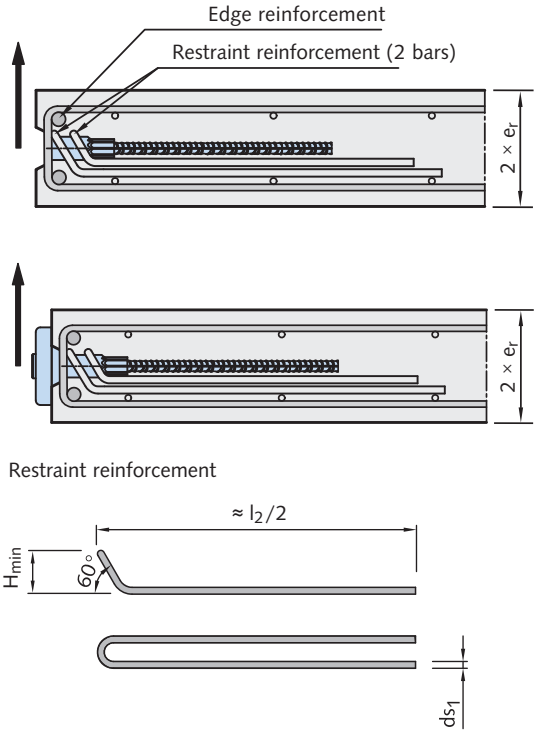
Reinforcement and load capacities in diagonal loads up to 45°

Load class		Article name	Thread	min. unit thickness	Main reinforcement	Edge reinforcement	Additional reinforcement				for concrete compressive strength f_{ci}			Axial spacing
							Diagonal reinforcement				≥15 N/mm²	≥25 N/mm²		
				$2 \times e_r$			d_{s1}	l_{s1}	d_{br}	Elongated length	② Load capacity	① Load capacity	② Load capacity	e_z
			Rd	[mm]	[mm²/m]	[mm]	[mm]	[mm]	[mm]	[mm]	[kN]	[kN]	[kN]	[mm]
	0,5	6319-0,5-190	12	60	1 × 188	Ø8	6	300	30	320	4.0	5.0	5.0	350
	0,8	6319-0,8-230	14	60	1 × 188	Ø8	8	400	30	430	5.7	8.0	7.8	390
	1,2	6319-1,2-270	16	100	2 × 131	2 × Ø8	8	600	30	640	8.0	12.0	10.3	420
	1,6	6319-1,6-350	18	100	2 × 188	2 × Ø10	10	600	40	640	10.0	16.0	13.0	500
	2,0	6319-2,0-350	20	100	2 × 188	2 × Ø10	10	800	40	840	13.0	20.0	16.8	550
	2,5	6319-2,5-400	24	100	2 × 188	2 × Ø10	10	1000	40	1050	16.0	25.0	20.7	620
	4,0	6319-4,0-540	30	140	2 × 188	2 × Ø12	12	1200	50	1260	26.0	40.0	33.5	710
	6,3	6319-6,3-670	36	140	2 × 188	2 × Ø12	16	1500	60	1600	37.0	63.0	47.8	830
	8,0	6319-8,0-780	42	160	2 × 188	2 × Ø14	20	1800	80	2000	49.0	80.0	63.2	1000
	12,5	6319-12,5-1100	52	200	2 × 188	2 × Ø14	20	1800	80	2000	68.0	116.0	87.8	1050

① For applications when using the adapter with the universal head clutch, perfect head and combi head.
② For anchor loop application. f_{ci} = concrete cube strength at time of lifting.

DEHA Rod anchor





Anchor loops are not allowed to be subjected to shear load. Use a perfect head or an adapter instead.

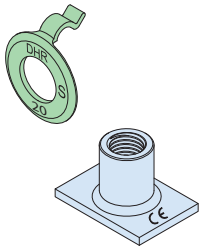
The restraint reinforcement must be fixed with direct contact to the anchor sleeve.

Reinforcement and load capacities in diagonal loads and pitching up to 90°

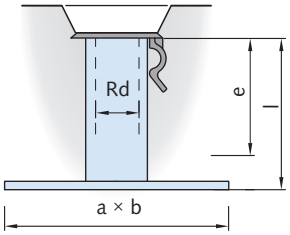
Load class		Article name	Thread	min. unit thickness 2 × e_r with perfect head or rotary head	min. unit thickness 2 × e_r with adapter	Main reinforcement mesh	Edge reinforcement	Restraint reinforcement					Load capacity [kN] at concrete compression strength f_{ci}	
								d_{s1}	$D_{1\,min}$	$D_{2\,min}$	H_{min}	l_2 Elongated length	≥ 15 N/mm²	≥ 25 N/mm²
			Rd	[mm]	[mm]	[mm²/m]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		
	0,5	6319-0,5-190	12	80	60	1 × 188	Ø 8	6	30	80	20	650	2.0	2.5
	0,8	6319-0,8-230	14	100	60	1 × 188	Ø 8	6	30	80	20	650	2.5	3.2
	1,2	6319-1,2-270	16	120	100	2 × 131	2 × Ø 8	10	40	100	30	1050	4.0	5.2
	1,6	6319-1,6-350	18	120	100	2 × 188	2 × Ø10	10	40	100	40	1050	6.0	7.2
	2,0	6319-2,0-350	20	140	100	2 × 188	2 × Ø10	10	40	100	50	1050	9.0	10.0
	2,5	6319-2,5-400	24	140	100	2 × 188	2 × Ø10	10	40	100	50	1050	11.0	12.5
	4,0	6319-4,0-540	30	160	140	2 × 188	2 × Ø12	16	60	120	70	1700	16.0	20.0
	6,3	6319-6,3-670	36	160	140	2 × 188	2 × Ø12	16	60	120	90	1700	27.0	31.5
	8,0	6319-8,0-780	42	160	160	2 × 188	2 × Ø14	16	60	120	100	1700	37.0	40.0
	12,5	6319-12,5-1100	52	200	200	2 × 188	2 × Ø14	20	80	160	100	2200	41.0	53.0

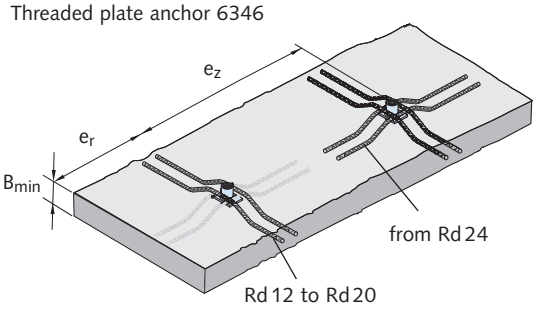
f_{ci} = concrete cube strength at time of lifting

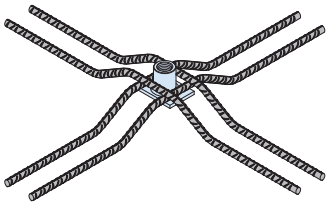
DEHA Plate anchor



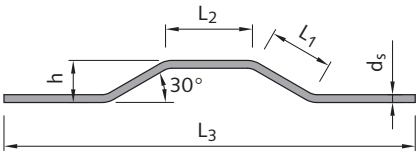
Threaded plate anchor 6346







The threaded plate anchor is used for lifting large surface, thin concrete elements, which are lifted perpendicular to their largest surface (slabs and shells). Verification for load case "lifting" and required bending reinforcement must be provided.



h = depending on unit thickness

The additional reinforcement is placed and secured on top of the plate anchor.

The reinforcement must be in direct contact with the anchor plate.

For thread sizes larger than Rd 24 place the additional reinforcement cross-wise in pairs. Additional reinforcement in one direction is adequate for smaller load classes.

Dimensions and installation values

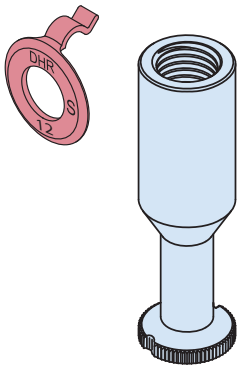
Load class		Zinc plated		Stainless steel A4		Thread	a	b	l	e	Anchor spacing	Edge distance
		Article name	Order no. 0740.050-	Article name	Order no. 0740.050-	Rd	[mm]	[mm]	[mm]	[mm]	e_z [mm]	e_r [mm]
	0,5	6346-0,5	00001	6346-12 A4	00008	12	25	35	30	22	350	200
	0,8	6346-0,8	00002	6346-14 A4	00009	14	35	35	33	26	350	220
	1,2	6346-1,2	00003	6346-16 A4	00010	16	35	50	36	30	500	250
	1,6	6346-1,6	00004	6346-18 A4	00011	18	45	60	44	34	600	310
	2,0	6346-2,0	00005	6346-20 A4	00012	20	60	60	47	38	600	360
	2,5	6346-2,5	00006	6346-24 A4	00013	24	60	80	54	46	800	400
	4,0	6346-4,0	00007	6346-30 A4	00014	30	80	100	72	58	1000	500
	6,3	6346-6,3	00015	6346-36 A4	00016	36	100	100	84	67	1300	650

Reinforcement for load capacities up to 45°

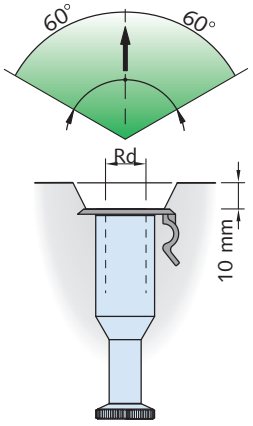
Load class		Article name	min. slab thickness B_{min} ②	Main reinforcement mesh	Additional reinforcement						Load capacity [kN] with concrete strength f_{ci}		
					Number of rebar required	d_s	h_{min}	L_1	L_2	L_3	15 N/mm² for		25 N/mm² for
			[mm]	[mm²/m]		[mm]	[mm]	[mm]	[mm]	[mm]	Axial load < 30°	Diagonal load ① < 45°	Axial and diagonal load ①
	0,5	6346-0,5	70	131	2	6	30	60	60	330	5.0	4.0	5.0
	0,8	6346-0,8	80	131	2	6	35	70	70	360	8.0	6.4	8.0
	1,2	6346-1,2	85	131	2	8	35	70	70	420	12.0	9.6	12.0
	1,6	6346-1,6	95	188	2	8	40	80	80	530	16.0	12.8	16.0
	2,0	6346-2,0	100	188	2	10	40	80	80	640	20.0	16.0	20.0
	2,5	6346-2,5	115	188	4	10	50	100	100	640	25.0	20.0	25.0
	4,0	6346-4,0	140	211	4	12	55	110	110	830	40.0	32.0	40.0
	6,3	6346-6,3	160	211	4	14	60	120	140	1140	63.0	50.4	63.0

f_{ci} = Cube concrete strength at time of lifting.
① Diagonal reinforcement is required for diagonal loads between 30° up to 45°, see combi-anchor.
② Applies for 10 mm nailing plate.

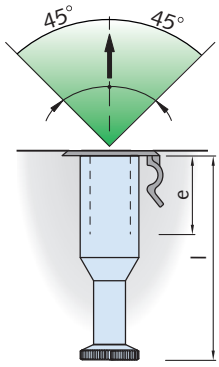
DEHA Crown anchor and DEHA Short anchor



Crown anchor 6380



...with nailing plate



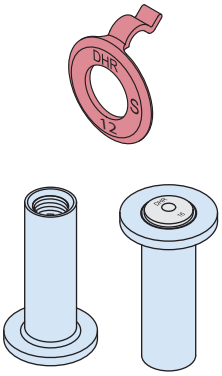
...without nailing plate

The crown anchor is used to lift large-surface, flat, reinforced precast elements; floor slabs and similar.

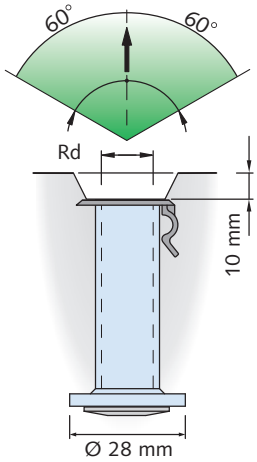
Precondition is that the slab is verified for load case "lifting" and the necessary bending reinforcement for the anchors is installed.

Crown anchors without nailing plates have a reduced load capacity.

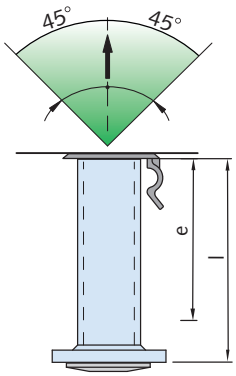
Crown and short anchors are **not suitable** for use in facing edges of thin wall elements.



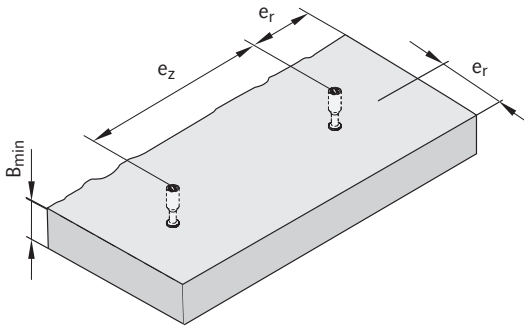
Short anchor 6308



...with nailing plate



...without nailing plate



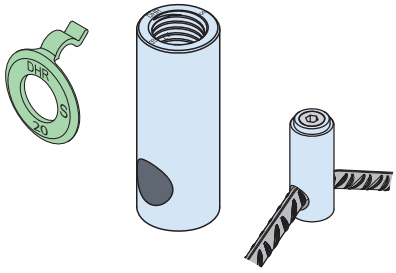
Short anchors without nailing plates have a reduced load capacity.

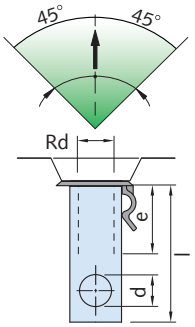
Dimensions and load capacity

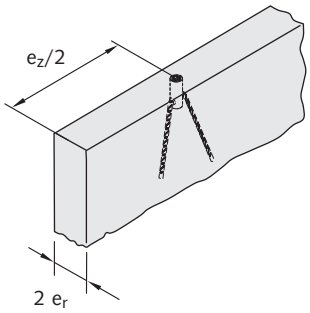
Load class		Zinc plated: Article name	Zinc plated: Order no. 0740.	Thread Rd	l [mm]	e [mm]	minimun slab thickness B_{min} ② [mm]	Main reinforcement mesh [mm²/m]	Load capacity [kN] concrete compression strength f_{ci}: 15 N/mm² for: Axial load < 30°	15 N/mm² for: Diagonal load ① < 45°	25 N/mm² for: Axial and diagonal load ①	Axial spacing e_z [mm]	Edge spacing e_r [mm]
Installation **with** nailing plate													
	0,5	6308-0,5- 50	060-00001	12	50	42	75	131	5.0	4.0	5.0	150	100
	0,5	6380-0,5- 60	020-00001	12	60	24	85	131	5.0	4.0	5.0	180	120
Installation **without** nailing plate													
	0,5	6308-0,5- 50	060-00001	12	50	42	65	131	4.0	3.2	4.0	150	100
	0,5	6380-0,5- 60	020-00001	12	60	24	75	131	4.0	3.2	4.0	180	120

f_{ci} = Concrete cube strength at time of lifting. ① Diagonal reinforcement must be provided for diagonal loads between 30° and 45°, see combi-anchor.
② Applies for 10 mm nailing plate.

DEHA Plain anchor







The plain anchor is used for lifting thin precast walls or walls with low concrete strength. The required hanger reinforcement is inserted through the hole in the lower part of the anchor.

The plain anchor is calculated to ensure the total anchor load is transferred through the reinforcement into the concrete. The hanger reinforcement must be installed with full contact to the bottom edge of the hole.

The DEHA Plain anchor is **not suitable** for use in slabs or for shear loads.

Dimensions and installation values

Load class		Zinc plated		Stainless steel A4		Thread	l	e	d	Axial spacing
		Article name	Order no. 0740.040-	Article name	Order no. 0740.040-	Rd	[mm]	[mm]	[mm]	e_z [mm]
	0,5	6372-0,5	00001	6372-12 A4	00009	12	50	22	9.5	400
	0,8	6372-0,8	00002	6372-14 A4	00016	14	54	26	11.5	500
	1,2	6372-1,2	00003	6372-16 A4	00011	16	61	30	14.0	500
	1,6	6372-1,6	00004	-	-	18	70	34	14.5	600
	2,0	6372-2,0	00005	6372-20 A4	00013	20	73	38	16.5	600
	2,5	6372-2,5	00006	6372-24 A4	00014	24	86	46	19.0	700
	4,0	6372-4,0	00007	6372-30 A4	00015	30	107	58	22.0	800
	6,3	6372-6,3	00008	6372-36 A4	00017	36	136	67	29.0	900

Dimensions and installation values — axial loads

Load class		Article name	min. unit thickness	Main reinforcement mesh	Load capacity [kN] with concrete compression strength f_{ci}			Additional reinforcement							
					15 N/mm² for		25 N/mm² for			Reducing the rebar length is permitted; bend the ends into hooks as illustrated					
			$2 \times e_r$		Axial load < 30°	Diagonal load < 45°	Axial load and dia. load	d_s	d_{br}	l_1 [mm] for concrete compression strength					
			[mm]	[mm²/m]	15 N/mm²	15 N/mm²	25 N/mm²	[mm]	[mm]	15 N/mm²	25 N/mm²	35 N/mm²	45 N/mm²	55 N/mm²
	0,5	6372-0,5	60	131	5.0	4.0	5.0	6	24	440	340	280	240	240
	0,8	6372-0,8	70	131	8.0	6.4	8.0	8	32	540	420	340	300	260
	1,2	6372-1,2	70	131	12.0	9.6	12.0	10	40	640	500	400	340	300
	1,6	6372-1,6	80	188	16.0	12.8	16.0	10	40	840	660	560	460	400
	2,0	6372-2,0	90	188	20.0	16.0	20.0	12	48	880	680	560	480	420
	2,5	6372-2,5	100	188	25.0	20.0	25.0	14	56	940	740	600	520	440
	4,0	6372-4,0	120	211	40.0	32.0	40.0	16	64	1320	1024	860	720	640
	6,3	6372-6,3	180	211	63.0	50.4	63.0	20	140	1640	1280	1080	1640	780

Diagonal reinforcement as for the combi-anchor; please refer to page 15

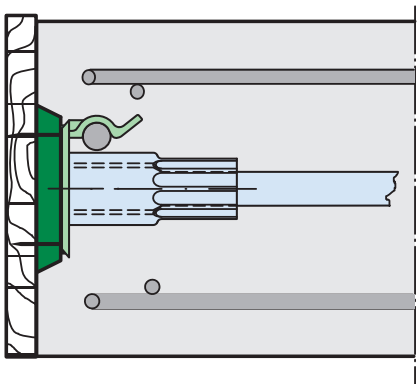
f_{ci} = cube concrete strength at time of lifting

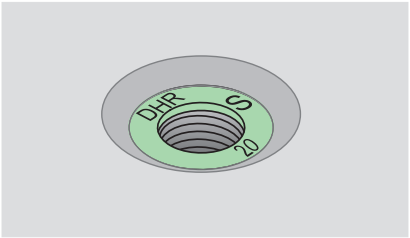
General information

Numerous accessories are available to facilitate installation of socket anchors. Various accessories are available for each DEHA Lifting element.

The nailing plates are either nailed to the formwork or fixed using retaining bolts, screws or pins through holes made in the formwork.
Various magnetic plates are available for use with steel formwork.

The socket anchor and the DEHA Identification cap are screwed onto the nailing plate respectively the magnetic plate. Ensure the socket with the identification cap is fully tightened and flush with the plate.





After the concrete has sufficiently set, and the formwork and the nailing plates have been removed; a lifting link can be connected.

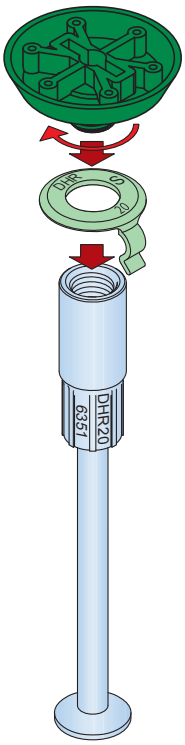
According to the safety regulation for lifting anchors and systems, the identification marking of all cast-in lifting anchors must remain clearly visible, even after final installation.
This requirement is met with the installation of the identification cap.

DEHA Identification cap

The colour of the plastic identification cap depends on the thread size. It is fixed between the anchor and the nailing plate or in the case of steel formwork, between the anchor and the magnetic plate. The identification cap also helps to secure any additional reinforcement for diagonal or shear load directly to the anchor. This ensures the additional reinforcement is in direct contact with the anchor sleeve.

After removing the nailing plate the thread size is quickly identified by the colour of the cap.

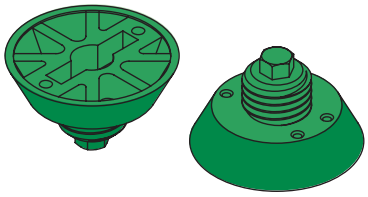
Additionally the thread size and the manufacturer's name are also marked on the identification cap.



Identification cap

Load class		Article name	Order no. 0741.110-	Thread M/Rd
	0,5	6357-12	00001	12
	0,8	6357-14	00002	14
	1,2	6357-16	00003	16
	1,6	6357-18	00004	18
	2,0	6357-20	00005	20
	2,5	6357-24	00006	24
	4,0	6357-30	00007	30
	6,3	6357-36	00008	36
	8,0	6357-42	00009	42
	12,5	6357-52	00010	52

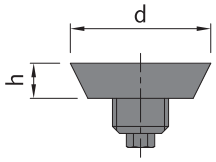
Combi nailing plate, plastic



The combi nailing plate is used to fix socket anchors to formwork. Thread sizes range from Rd 12 to Rd 52.

The recess made by the combi nailing plates fits the shape of the **rotary head clutch** and the **perfect lifting head** exactly. The shape of the recess allows the lifting clutch to distribute shear or diagonal load more effectively into the concrete.

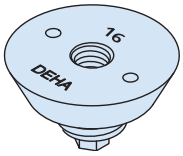
The nailing plate for the combi-anchor is made of plastic and is colour coded according to the size of the thread.



Combi nailing plate, plastic

Load class		Article name	Order no. 0741.040-	Thread M/Rd	h [mm]	D_1 [mm]
	0,5	6358-12	00001	12	10	40
	0,8	6358-14	00002	14	10	40
	1,2	6358-16	00003	16	10	40
	1,6	6358-18	00004	18	10	55
	2,0	6358-20	00005	20	10	55
	2,5	6358-24	00006	24	10	55
	4,0	6358-30	00007	30	10	70
	6,3	6358-36	00008	36	10	70
	8,0	6358-42	00009	42	12	95
	12,5	6358-52	00010	52	12	95

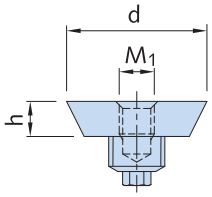
Nailing plate, steel



Finish: Zinc plated

The shape of the recess formed by the nailing plate enables the use of the **DEHA Combi lifting head** or the **DEHA Perfect lifting head** for lifting. The shape of the recess allows the lifting clutch to distribute shear or diagonal load more effectively into the concrete.

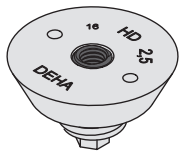
The steel nailing plates are available in thread sizes Rd 18 to Rd 52.
The nailing plates are delivered in a zinc plated finish.



Nailing plate, steel

Load class		Article name	Order no. 0741.190-	Thread M/Rd	d [mm]	h [mm]	M_1
	0,5	6369-12	00001	12	40	10	6
	1,2	6369-16	00002	16	40	10	10
	2,0	6369-20	00003	20	55	10	12
	2,5	6369-24	00004	24	55	10	12
	4,0	6369-30	00005	30	70	10	12
	6,3	6369-36	00006	36	70	10	16
	8,0	6369-42	00007	42	95	12	16
	12,5	6369-52	00008	52	95	12	16

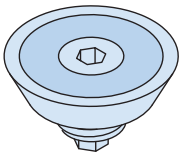
Nailing plate, steel with adapter



Nailing plate, steel with adapter

Load class		Article name	Order no. 0741.190-	Thread M/Rd	d [mm]	h [mm]	M_1
	0,5	corresponds to 6369-12					
	1,2	6369-16 A	00102	16	40	10	6
	2,0	6369-20 A	00103	20	55	10	6
	2,5	6369-24 A	00104	24	55	10	6
	4,0	6369-30 A	00105	30	70	10	6

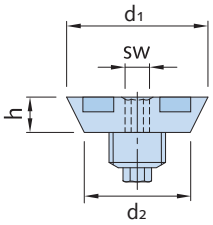
Magnetic plate



Finish: zinc plated

The magnetic plates are used to fix socket anchors to metal formwork. The plates are delivered in a zinc plated finish for thread sizes Rd 12 to Rd 52.

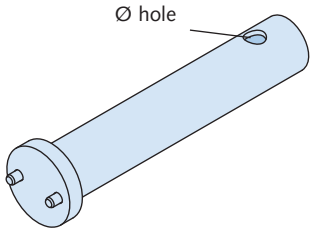
The shape of the recess formed by the nailing plate enables the use of the DEHA Perfect lifting head or the adapter.



Magnetic plate

Load class	Article name	Order no. 0741.180-	Rd thread	d_1 [mm]	d_2 [mm]	h [mm]	SW
0,5	6365-12	00001	12	40	30	12	6
1,2	6365-16	00002	16	40	30	12	6
2,0	6365-20	00003	20	55	45	12	10
2,5	6365-24	00004	24	55	45	12	10
4,0	6365-30	00005	30	70	60	12	16
6,3	6365-36	00006	36	70	60	12	16
8,0	6365-42	00007	42	95	85	12	16
12,5	6365-52	00008	52	95	85	12	16

Tool for steel nailing plate

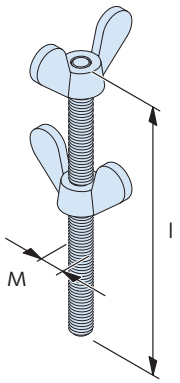


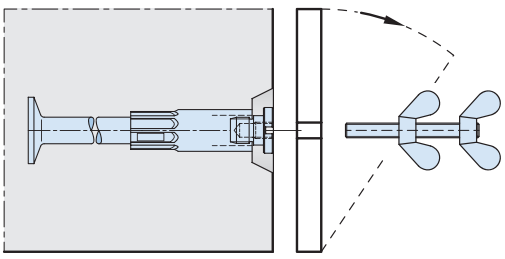
This tool is used to remove the steel nailing plate after the concrete has set and the formwork has been removed.

Tool to remove the steel nailing plate

Article name	Order no. 0741.350-	Rd thread [mm]	Ø Hole size [mm]
6337-12 / 16	00001	12–16	10.5
6337-20 / 52	00002	20–52	10.5

Retaining bolt S1



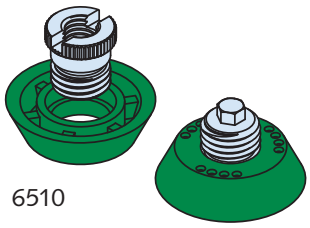


The retaining bolt is used to fix the steel nailing plate to the formwork. A crimped butterfly bolt at one end is used to tighten the bolt; a second butterfly bolt is used to secure the bolt against the formwork.

Retaining bolt

Article name	Order no. 0073.060-	Thread	l [mm]
TPA-S1-08	00001	M 8	160
TPA-S1-10	00004	M 10	160
TPA-S1-12	00002	M 12	160
TPA-S1-16	00003	M 16	160

Combi nailing plate with steel core and replacement ring — height 10 mm



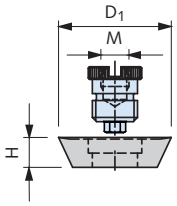
6510

The combi nailing plate which consists of a steel core and a plastic replacement ring is used for fixing a socket anchor to formwork. Available for thread sizes Rd 12 to Rd 52.

The recess made by the combi nailing plate fits the shape of the rotary and the perfect head lifting clutch exactly. The shape of the recess allows the lifting clutch to distribute diagonal or shear load more effectively into the concrete. The nailing plate core is made of chrome plated metal. The replacement ring is made of flexible plastic.

Replacement ring available separately (see HALFEN Price list)

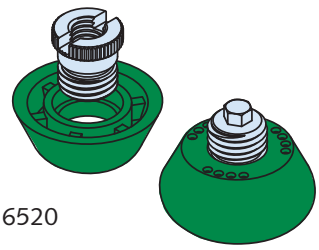
A retaining bolt is available to attach the nailing plate quickly and securely to the formwork. All bolts used to fix HD Nailing plates to the formwork must be unscrewed and removed before striking the formwork.



Nailing plate with steel core and replacement ring

Load class		Article name	Order no. 0741.080-	Thread M/Rd	H [mm]	D_1 [mm]	M [mm]
	0,5	6510-12	00101	12	10	40	8
	0,8	6510-14	00002	14	10	40	8
	1,2	6510-16	00103	16	10	40	10
	1,6	6510-18	00004	18	10	55	10
	2,0	6510-20	00105	20	10	55	12
	2,5	6510-24	00106	24	10	55	12
	4,0	6510-30	00107	30	10	70	12
	6,3	6510-36	00108	36	10	70	12
	8,0	6510-42	00109	42	12	95	12
	12,5	6510-52	00110	52	12	95	12

Combi nailing plate with steel core and replacement ring — height 20 mm



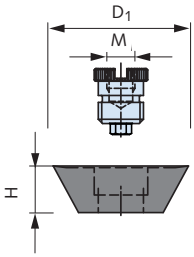
6520

The combi nailing plate which consists of a steel core and a plastic replacement ring is used for fixing a HD Anchor to the formwork. Available for thread sizes 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 HALFEN Price list)

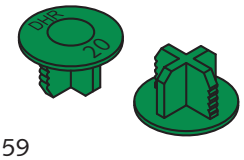
The bolts used to secure the nailing plate to the formwork must be unscrewed and removed before striking the formwork.



Combi nailing plate with steel core and replacement ring

Load class		Article name	Order no. 0741.210-	Thread M/Rd	H [mm]	D_1 [mm]	M [mm]
	0,5	6520-12	00101	12	20	50	8
	0,8	6520-14	00002	14	20	50	8
	1,2	6520-16	00103	16	20	50	8
	1,6	6520-18	00004	18	20	65	10
	2,0	6520-20	00105	20	20	65	12
	2,5	6520-24	00106	24	20	65	12
	4,0	6520-30	00107	30	20	80	12
	6,3	6520-36	00108	36	20	80	12
	8,0	6520-42	00109	42	20	105	12
	12,5	6520-52	00110	52	20	105	12

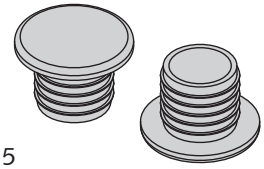
DEHA Sealing plugs



6359

The underside of the sealing plug has a cross-shape design. The taper on the tip of the cross ensures the sealing plug is centred correctly. The sealing plug is both fast and easy to install as well as easy to remove.

The plug is inserted into the thread immediately after removing the nailing plate to prevent dirt getting into the anchor and damaging the thread.



6315

The sealing plug (6359) is serrated; the serration stops the plug falling out. The plugs are colour-code according to the thread size; in addition the thread size is stamped on the plugs.

The grey sealing plug (6315) is used to seal the anchor socket after the precast element is installed.

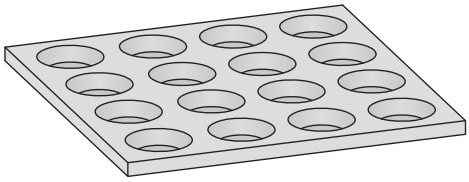
Sealing plug 6359

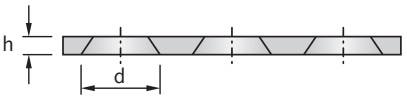
Load class	Article name	Order no. 0741.120-	Thread M/Rd
0,5	6359-12	00001	12
0,8	6359-14	00002	14
1,2	6359-16	00003	16
1,6	6359-18	00004	18
2,0	6359-20	00005	20
2,5	6359-24	00006	24
4,0	6359-30	00007	30
6,3	6359-36	00008	36
8,0	6359-42	00009	42
12,5	6359-52	00010	52

Sealing plug 6315

Load class	Article name	Order no. 0741.130-	Thread M/Rd
0,5	6315-12	00001	12
0,8	6315-14	00002	14
1,2	6315-16	00003	16
1,6	6315-18	00004	18
2,0	6315-20	00005	20
2,5	6315-24	00006	24
4,0	6315-30	00007	30
6,3	6315-36	00008	36
8,0	6315-42	00009	42
12,5	6315-52	00010	52

Mould





Mould, rubber

Load class	Article name	Order no. 0741.290-	h	d	Number of recess fillers
0,5	6329-12-16	00001	10	40	16
0,8					
1,2					
1,6	6329-18-24	00002	10	55	16
2,0					
2,5					
4,0	6329-30-36	00003	10	70	16
6,3					
8,0	6329-42-52	00004	12	95	9
12,5					

Mould for the production of concrete recess sealers. The recess fillers are used to seal the recesses made by the nailing plate. The finished concrete recess fillers have the same structure as the formwork and blend in to the surface of the precast concrete elements. The mould is reusable.

Application only for type with 10 mm height.

General

Always observe the instruction manual as well as the installation and assembly instructions when using DEHA Lifting equipment.
The lifting attachment must be fully screwed into the anchor socket.
A maximum of one thread may remain visible when the anchor is fully installed. Use a suitable bolt, the same size as the anchor socket, to clean and remove any concrete remnants in the lifting anchors thread to ensure minimum thread depth in the socket.

Cable loops are preferable hung in crane hooks with large cross sections. Crane hooks with sharp edges or crane hooks with minimal cross sections and therefore small diameters may damage and cause cables to deteriorate faster, resulting in a shorter lifespan.
Always observe the applicable accident prevention regulations for your region. For Germany, these are BGV D 6 "Crane" *(Krane)* and BGR 500 "*General regulations for the use of cranes and load lifting hoisting equipment*". (Lastaufnahmeeinrichtungen im Hebezeugbetrieb)

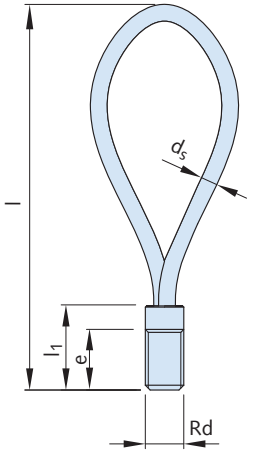
Identification
DEHA Load lifting links are supplied with a colour identification label. The label identifies the manufacturer, the year of manufacture (for example: 08), the thread size (for example: Rd 30) as well as the load class.

Colour codes for the various load classes → see page 8.

DEHA Lifting loop

The DEHA Lifting loop is a lifting attachment for application as specified in the following table.
Refer to the following table for load-carrying capacities for different applications.

DEHA Lifting loops can be subjected to diagonal load up to a maximum of 45°. Use the **rotary head** or the **perfect head** for shear loads.

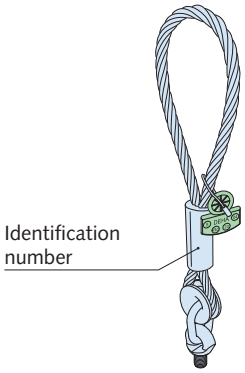


Before each use check all lifting equipment for correct application and visually inspect to ensure damage-free condition!
It is prohibited to use damaged lifting equipment!

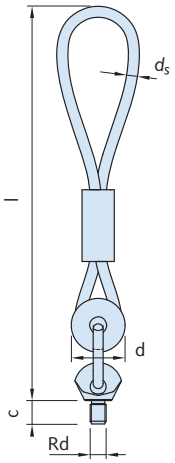
Dimensions — lifting loops

Load class			Article name	Order no. 0742.040-	Thread Rd	d_s [mm]	e [mm]	l_1 [mm]	l [mm]
	pink	0,5	6311-12	00001	12	Ø 6	18	27	155
	yellow	0,8	6311-14	00002	14	Ø 7	21	32	155
	white	1,2	6311-16	00003	16	Ø 8	24	36	155
	black	1,6	6311-18	00004	18	Ø 9	27	40	190
	light green	2,0	6311-20	00005	20	Ø10	30	45	215
	light blue	2,5	6311-24	00006	24	Ø12	36	54	255
	lilac	4,0	6311-30	00007	30	Ø14	45	68	300
	yellow	6,3	6311-36	00008	36	Ø16	54	81	340
	light brown	8,0	6311-42	00009	42	Ø20	63	95	425
	dark grey	12,5	6311-52	00010	52	Ø26	78	117	480

DEHA Perfect head lifting clutch



The perfect head is especially suited for diagonal loads and is used for pitching wall elements upright with load angles less than 90°: Observe the application instructions for the combi head. Each perfect head has a unique identification number. The unique number correctly identifies the lifting link and helps to ensure that each unit is properly checked for operational safety at regular intervals.



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 — perfect head

Load class			Article name	Order no. 0742.	Thread Rd	l [mm]	d [mm]	c [mm]	d_s [mm]
red		0,5/ 1,3	6377-12	170-00001	12	300	41	18.5	8
yellow		0,8	6313-14	060-00002	14	340	41	21.0	9
light grey		1,2/ 2,5	6377-16	170-00002	16	390	54	23.5	11
black		1,6	6313-18	060-00004	18	430	54	27.0	12
green		2,0/ 4,0	6377-20	170-00003	20	510	70	29.0	14
blue		2,5/ 5,0	6377-24	170-00004	24	550	70	35.0	16
violet		4,0/ 7,5	6377-30	170-00005	30	700	98	43.0	20
orange		6,3/10,0	6313-36	170-00006	36	760	98	51.5	22
brown		8,0/12,5	6313-42	170-00007	42	860	124	59.5	24
black		12,5/15,0	6313-52	170-00008	52	940	124	72.5	28

The following options are available when ordering:

- a certificate that confirms that all guidelines and quality controlled manufacture are observed; also includes type of lifting link, the identification number and an inspection table
- a written report confirming the lifting link was tested to twice its nominal load capacity

Please see our current price list for order numbers.

Checking the cable loops

All load suspension devices must be inspected for fitness of use at least once a year by a qualified expert. Steel cables do not have a determined maximum working life. HALFEN can only ensure the correct function and safety when using the perfect head with the original thimble and ferrule. The screw thread must be regularly checked for signs of damage.
Re-cutting the thread is not permitted.
Cable loops must be checked for the following defects:

- kinking
- breakage in a loop
- loosening of the exterior wires in the length of the cable
- compressive deformation
- crushing in the load area of the load loop with more than 4 wire breaks in strand-cables and more than 10 breaks in wire-laid cables
- signs of corrosion
- damage or exaggerated wear in the cable or cable ferrule
- large number of broken wires

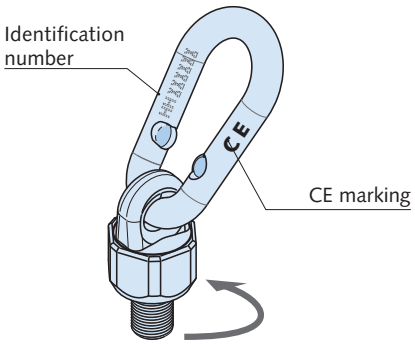
Discard the cable if the following number of broken wires are visible:

Wire breaks

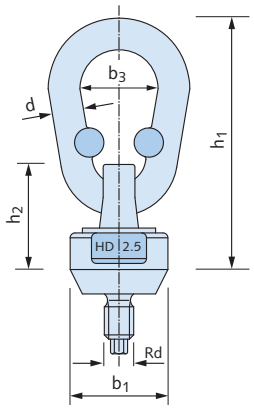
	Visible wire breaks over a cable length of		
cable type	3d	6d	10d
strand cable	4	6	16

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 HALFEN to be re-pressed.

6367 Rotary head lifting clutch



Application:
The HD Rotary head lifting clutch can be used for diagonal as well as for shear loads.
The rotatable head facilitates insertion into the HD Anchor without turning the anchor head.



Dimensions — Rotary head lifting clutch

Load class anchor	Clutch identifier	Article name	Order no. 0742.230-	Thread Rd	b_1 [mm]	b_3 [mm]	h_1 [mm]	h_2 [mm]	wrench [–]	d [mm]
0,5	1,3	6367-12	00001	12	40	32	100	25	34	13
1,2	2,5	6367-16	00002	16	40	32	100	25	34	13
2,0	4,0	6367-20	00003	20	55	34	126	28	46	16
2,5	5,0	6367-24	00004	24	57	45	148	35	50	18
4,0	7,5	6367-30	00005	30	70	46	163	41	65	20
6,3	10,0	6367-36	00006	36	70	46	163	41	65	20
8,0	12,5	6367-42	00007	42	95	60	201	48	75	23
12,5	15,0	6367-52	00008	52	95	60	201	48	75	23

The 6367 Rotary head lifting clutch

- forged spanner notches on the rotary clutch 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

Improved load transfer with a specially shaped load surface

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!

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 HALFEN price list for order numbers.

Application rotary head lifting clutch

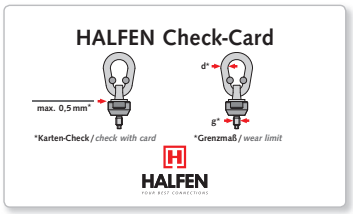
Pitch limits
Maximal angle of 45°
for diagonal load with cable spread
or 90° in pitching.

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

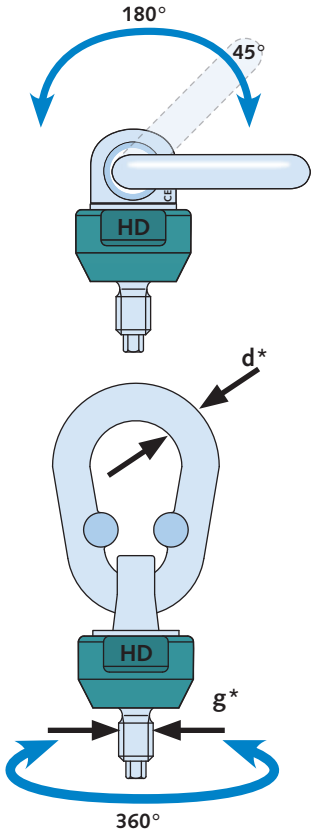
Range of movement
- 180° pivot
- 360° rotatable

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



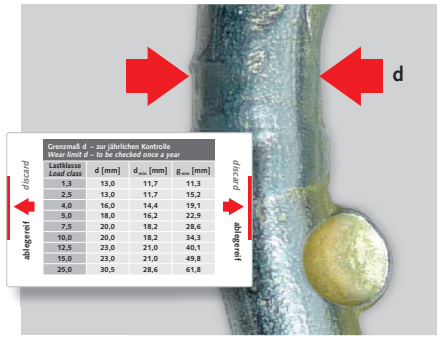
Checking the condition of the clutch using the HALFEN Check-Card.

The load capacity of the sleeve anchor is decisive.

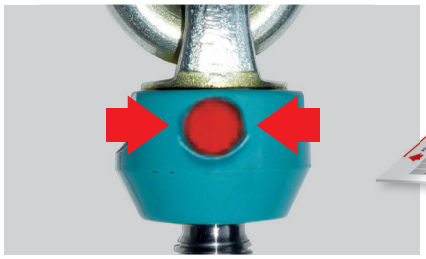


*(see table "wear limits")

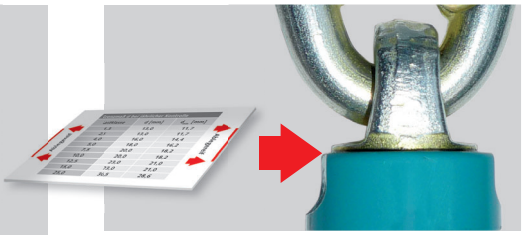
Checking the life-span
Using the HALFEN Check-card the condition of the rotary head link is easily checked on-site (see table below) by checking the join-gap and the handle. If a HALFEN Check-card is not available a 0.5 mm thick piece of metal can be used instead.



Life-span of the anchor link
Check the join and the minimum (d_{min}) thickness of the load handle to determine if the unit needs to be discarded.



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 the anchor if the card can be inserted deeper than the red line (as illustrated).

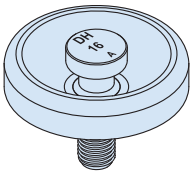
Load capacity — HD Rotary head lifting clutch

Load class	Article name	Order no. 0742.230-	Centric load* [kN]	Diagonal load* ≤45°[kN]	Shear load* [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

Wear limits — annual inspection

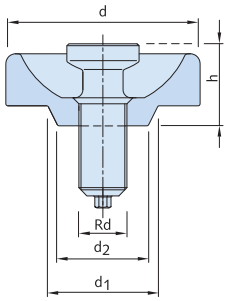
Load class	d [mm]	d_{min} [mm]	g_{min} [mm]
1,3	13.0	11.7	11.3
2,5	13.0	11.7	15.2
4,0	16.0	14.4	19.1
5,0	18.0	16.2	22.9
7,5	20.0	18.2	28.6
10,0	20.0	18.2	34.3
12,5	23.0	21.0	40.1
15,0	23.0	21.0	49.8

DEHA Adapter 6366



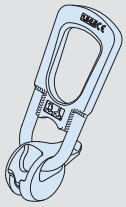
Adapter 6368 has to be applied when using 20 mm nailing plate.

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



Dimensions — Adapter

Load class	Article name	Order no. 0742.	Thread Rd	d [mm]	d_1 [mm]	d_2 [mm]	h [mm]	suitable for universal head lifting link
0,5	6366-12	140-00001	12	70	40	30	10	6102- 1,3
0,8	6303-14	090-00002	14	78	40	30	10	6102- 2,5
1,2	6366-16	140-00002	16	78	40	30	10	6102- 2,5
1,6	6303-18	090-00004	18	78	55	45	10	6102- 2,5
2,0	6366-20	140-00003	20	97	55	45	10	6102- 5,0
2,5	6366-24	140-00004	24	97	55	45	10	6102- 5,0
4,0	6366-30	140-00005	30	97	70	60	10	6102-10,0
6,3	6366-36	140-00006	36	117	70	60	10	6102-10,0
8,0	6366-42	140-00007	42	117	95	85	12	6102-20,0
12,5	6366-52	140-00008	52	177	95	85	12	6102-20,0



Inspection procedure — DEHA Adapter 6303

① Visual inspection for bending in the screw/thread and for other deformation (re-bending 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 adapter head thickness (see below).

⑤ Check thread diameter.

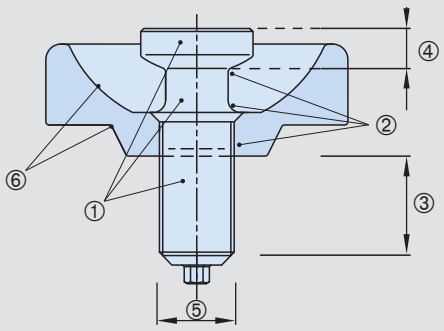
⑥ Visual inspection of pressure plate for obvious wear.

Wear limit — DEHA Adapter

Wear limits for the minimal-thread diameter ⑤ [mm]										
Load class	0,5	0,8	1,2	1,6	2,0	2,5	4,0	6,3	8,0	12,5
Thread Rd	12	14	16	18	20	24	30	36	42	52
Minimal-Thread-Ø	11.6	13.5	15.5	17.5	16.6	23.4	29.3	35.2	41.1	51.0
Minimum head thickness ④ [mm]										
Head size $_{min}$	7.0	10.0	10.0	10.0	11.5	11.5	16.0	16.0	24.5	24.5

Discard the adapter if:

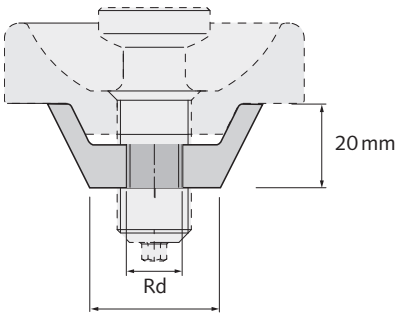
- the screw is bent or otherwise deformed, if the thread is damaged or if there are any signs of initial cracks
- the provided minimal head thickness and thread diameter in the table above can not be met due to excessive wear
- pressure plate wear has progressed so far that the universal head lifting link only has contact towards the top of the adapter-plate.



Nailing plate adapter

Adapter 6368 for 20 mm nailing plate adapter 6366

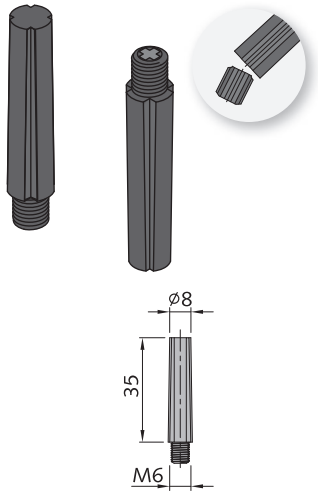
Load class		Article name	Order no. 0742.150-	Thread Rd	Screw depth 6366 **without** replacement ring [mm]	Screw depth **with** replacement ring [mm]	Nominal load [kN]
	0,5	6368-12	00001	12	18.5	8.5	5.0
	1,2	6368-16	00002	16	23.5	13.5	12.0
	2,0	6368-20	00003	20	29.0	19.0	20.0
	2,5	6368-24	00004	24	35.0	25.0	25.0
	4,0	6368-30	00005	30	43.0	33.0	40.0
	6,3	6368-36	00006	36	51.5	41.5	63.0
	8,0	6368-42	00007	42	59.5	51.5	80.0
	12,5	6368-52	00008	52	72.5	64.5	125.0



See nailing plate for diameter

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.

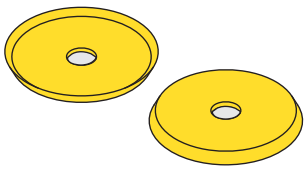


Assembly pin, plastic

Article name	Order no. 0741.300-	for M/Rd
6330-1,3-7,5	00001	12
		16
		20
		24
		30

Sealing plate, rubber

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

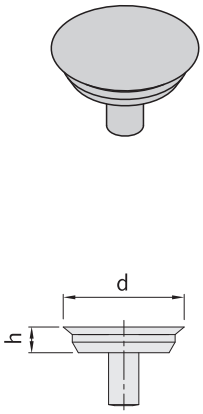


Sealing plate, rubber

Article name	Order no. 0741.330-	for Rd	d [mm]	h [mm]
6334-1,3-2,5	00001	12–16	40	1.5
6334-4,0-5,0	00002	18–24	55	1.5
6334-7,5-10,0	00003	30–36	70	1.5

HD Sealing plate

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.



HD Sealing plate

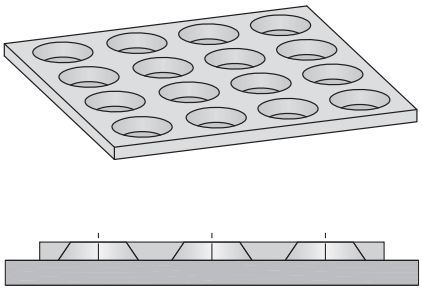
Article name	Order no. 0741.280-	for Rd	d [mm]	h [mm]
6513-12	00001	12	40	10
6513-16	00002	16	40	10
6513-20	00003	20	55	10
6513-24	00004	24	55	10

Sealing the nailing plate recesses

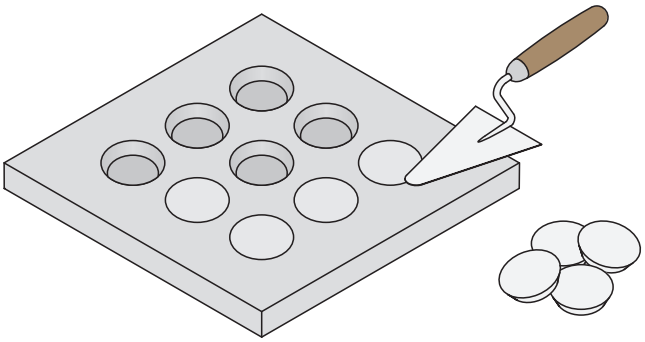
Recesses in precast balconies, stairs or other elements can be sealed with plastic or steel recess fillers. These however remain visible in the finished element as they are neither the same colour nor have the same texture.
If an aesthetic finish is required recesses can be cast in concrete using the same material and formwork as in the main element.
This provides a near uniform surface.

A PU (Polyurethane) mould is available to make custom recess fillers in the precast plant; this ensures a visually optimal solution. These fillers fit the recess created by the combi-nailing plate (6358) as well as the combi-nailing plate with steel core and replacement ring (6510) exactly and have the same characteristics as the precast element:

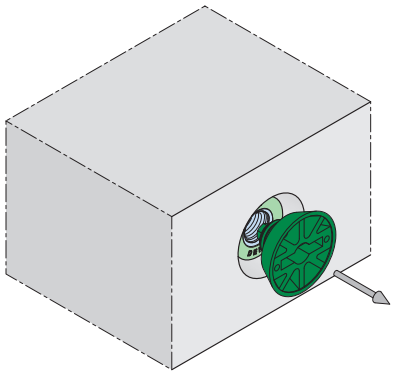
- in the same colouring
- in the same material
- with the same texture



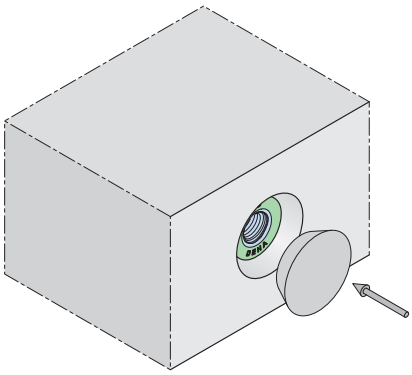
To seal the recesses, the precast plant can make custom recess fillers using the rubber mould. An optimal aesthetic finish is therefore ensured.



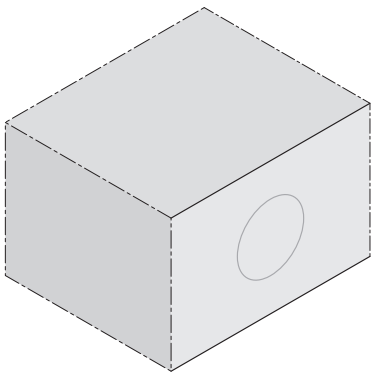
To achieve the required structure the recess filler mould (larger diameter of the circles face-down, see above) is placed on to the formwork and filled with concrete from the same batch as the main element. The concrete is then levelled off with a trowel. Once the concrete has hardened, remove the mould; the recess formers can now be removed from the mould and the recess fillers can be used.



After final installation of the precast element the recess fillers can be cemented in place.



We recommend using commercially available quick-set mortar.



The mould forms are reusable.

Installing the socket anchor using the assembly pin and the steel nailing plate

Assembly pins are used in staircases 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 (here shown is load class 2,5).

Fig. 1

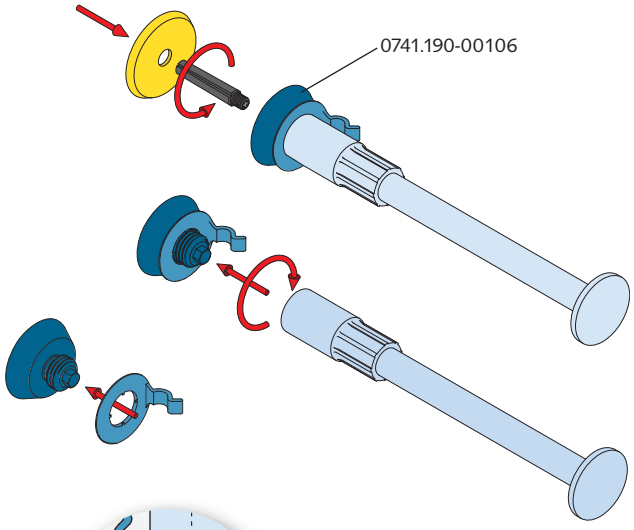


Figure 1:
The assembly pin is first screwed in the steel nailing plate and the sealing plate is then placed over the assembly pin.

Fig. 2

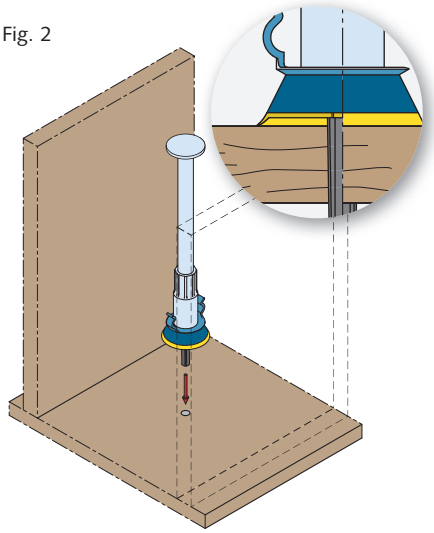


Figure 2:
The assembly pin is first screwed into the HD Anchor with the sealing plate held in place by the pin and then pressed through a pre-drilled 8 mm diameter hole in the formwork.
The assembly pin can be used in both timber and steel formwork.

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

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

Fig. 3

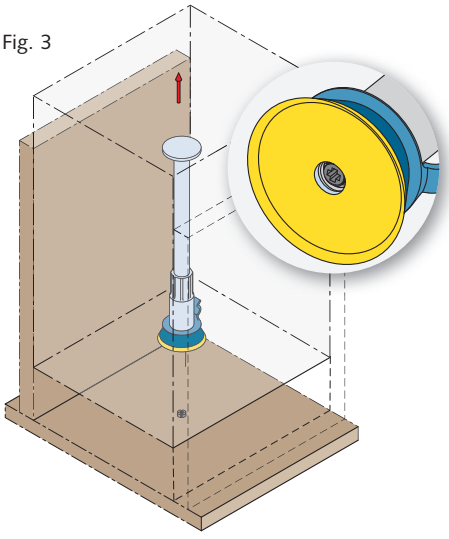


Figure 3:
The assembly pin has a design break-off point to facilitate removal of the formwork. The end of the pin left in the steel nailing plate can be removed with a crosshead screwdriver; the steel nailing plate is reusable.

The same assembly pin is used for all applications. The inner thread of M10 and M12 nailing plates are reduced to thread size M6 with a pre-fitted adapter.

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

The sealing plate is installed with the lip towards the formwork to ensure the nailing plate is properly sealed.

DEHA 6325 Lifting loops

The DEHA 6325 Lifting loops are used to lift precast reinforced concrete elements.

The lifting loops are identified with a colour label marked with the name of the manufacturer, year of production and load group information.

The lifting loops are always installed in the open top surface of the precast element. A longitudinal or lateral orientation is possible. The minimal element thickness (b and 2 × e_r) must be observed.

The loop-end with the ferrule is positioned in the formwork. The embed depths t and u must be observed. The identification label on the lifting loop must remain visible after casting the concrete.

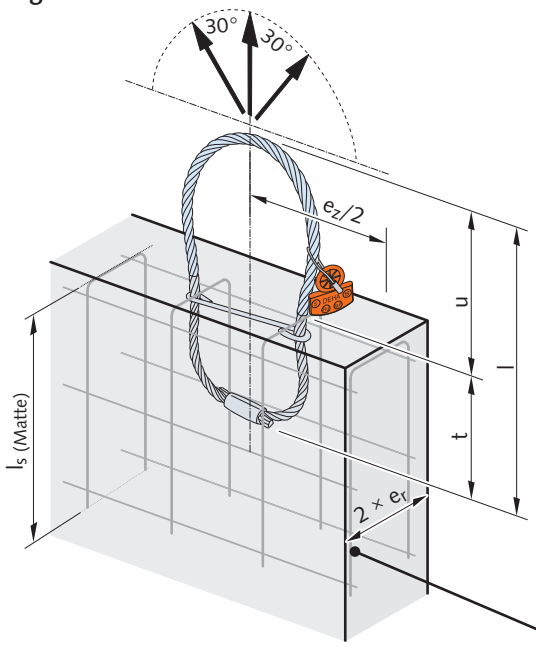
Crane hooks can be connected directly to the protruding lifting loops.
Make sure that the cable loops are not subjected to bending when storing the precast elements.

The product information describing the installation of DEHA Lifting loops must be kept available in the precast plant and on the construction site. Observe the regulations for hoisting and lifting equipment according to DIN EN 13414 and the VDI BV-BS 6205 guidelines.

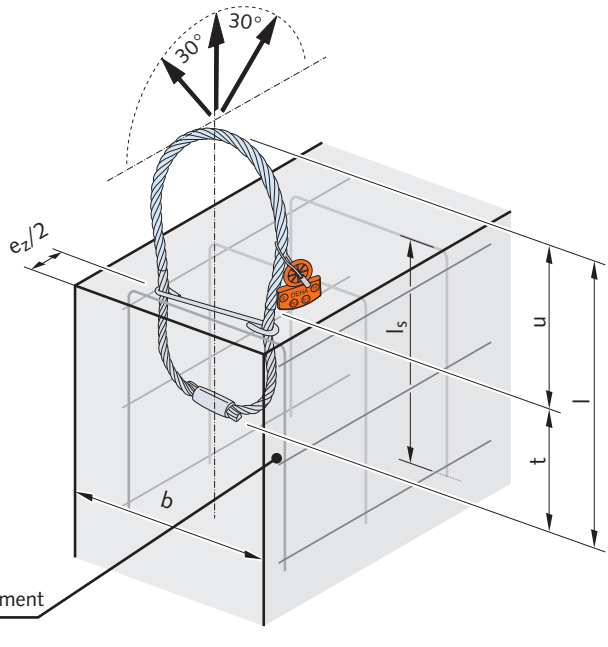
Dimensions and edge distances

Load class	Colour code	Article-name	Order no. 0742.110-	Cable-Ø [mm]	l [mm]	t [mm]	u [mm]	b_{min} [mm]	2 × $e_{r\,min}$ [mm]	e_z [mm]
0,8	yellow	6325-0,8	00001	6	205	145	60	120	70	270
1,2	white	6325-1,2	00002	7	230	165	65	140	80	310
1,6	black	6325-1,6	00003	8	250	180	70	150	90	350
2,0	light green	6325-2,0	00004	9	300	220	80	160	100	420
2,5	light blue	6325-2,5	00005	10	325	235	90	180	110	450
4,0	lilac	6325-4,0	00006	12	370	270	100	200	120	500
6,3	yellow	6325-6,3	00007	16	425	315	110	230	140	580
8,0	light brown	6325-8,0	00008	18	480	370	110	250	160	650
10,0	orange	6325-10,0	00009	20	525	405	130	280	180	730
12,5	dark grey	6325-12,5	00010	22	590	450	140	300	200	810
16,0	violet	6325-16,0	00011	24	670	510	160	350	240	390
20,0	brown	6325-20,0	00012	28	750	580	170	380	260	1060
25,0	green	6325-25,0	00013	32	850	660	190	400	280	1210

Longitudinal installation



Transverse installation



Q-Mesh reinforcement
U-shaped

DEHA Lifting loop 6325 — load capacities

Load capacities — Longitudinal installation

Load class		Colour code	Article-name	Reinforcement		Dimensions with concrete compression strength f_{ci} = 15 N/mm²		Load capacity	Dimensions with concrete compression strength f_{ci} = 35 N/mm²		Load capacity
				Mesh bent [mm²/m]	l_s [mm]	2 × e_r [mm]	$e_z/2$ [mm]	[kN]	2 × e_r [mm]	$e_z/2$ [mm]	[kN]
	0,8	yellow	6325-0,8	131	300	70	270	8.0	50	270	8.0
	1,2	white	6325-1,2	131	350	90	310	12.0	60	310	12.0
	1,6	black	6325-1,6	131	350	120	350	16.0	80	350	16.0
	2,0	light green	6325-2,0	188	450	140	420	20.0	100	420	20.0
	2,5	light blue	6325-2,5	188	500	160	450	25.0	110	450	25.0
	4,0	lilac	6325-4,0	188	550	220	500	40.0	150	500	40.0
	6,3	yellow	6325-6,3	188	600	320	580	63.0	220	580	63.0
	8,0	light brown	6325-8,0	188	700	400	650	80.0	280	650	80.0
	10,0	orange	6325-10,0	221	800	440	730	100.0	310	730	100.0
	12,5	dark grey	6325-12,5	221	900	560	810	125.0	390	810	125.0
	16,0	violet	6325-16,0	221	1000	620	930	160.0	430	930	160.0
	20,0	dark grey	6325-20,0	377	1115	680	1060	200.0	480	1060	200.0
	25,0	green	6325-25,0	377	1300	750	1210	250.0	530	1210	250.0

l_s = Leg length of the bent reinforcement mesh mat f_{ci} = Concrete cube strength at time of lifting

Load capacities — Transverse installation

Load class		Colour code	Article-name	Reinforcement		Dimensions with concrete compression strength f_{ci} = 15 N/mm²		Load capacity	Dimensions with concrete compression strength f_{ci} = 35 N/mm²		Load capacity
				Mesh bent [mm²/m]	l_s [mm]	b [mm]	$e_z/2$ [mm]	[kN]	b [mm]	$e_z/2$ [mm]	[kN]
	0,8	yellow	6325-0,8	131	300	135	270	8.0	135	270	8.0
	1,2	white	6325-1,2	131	350	140	310	12.0	140	310	12.0
	1,6	black	6325-1,6	131	350	170	350	16.0	170	350	16.0
	2,0	light green	6325-2,0	188	450	175	420	20.0	175	420	20.0
	2,5	light blue	6325-2,5	188	500	180	450	25.0	180	450	25.0
	4,0	lilac	6325-4,0	188	550	220	500	40.0	220	500	40.0
	6,3	yellow	6325-6,3	188	600	320	580	63.0	275	580	63.0
	8,0	light brown	6325-8,0	188	700	400	650	80.0	280	650	80.0
	10,0	orange	6325-10,0	221	800	440	730	100.0	310	730	100.0
	12,5	dark grey	6325-12,5	221	900	560	810	125.0	390	810	125.0
	16,0	violet	6325-16,0	221	1000	620	930	160.0	430	930	160.0
	20,0	brown	6325-20,0	377	1115	680	1060	200.0	480	1060	200.0
	25,0	green	6325-25,0	377	1300	750	1210	250.0	530	1210	250.0

l_s = Leg length of the bent reinforcement mesh mat f_{ci} = Concrete cube strength at time of lifting

Lifting loops showing signs of damage; broken strands, kinking, bird-caging or any signs of corrosion that require discarding in accordance with DIN EN 13414, are not to be used for further lifting.

Note: When using shackles to lift, the diameter of the shackles must under no circumstances be less than double the cable diameter of the lifting loop. We recommend using shackles with a diameter five times the diameter of the lifting loop cable.

HALFEN Accident recovery unit

The HALFEN Accident recovery unit is installed as a precautionary measure in road tunnels. In the event of an accident, crashed vehicles can be effectively and quickly recovered. Increasingly, emergency and accident recovery services demand that suitable accident recovery units are installed every 100 metres in suitable recesses in tunnel walls.

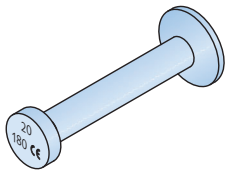
The HALFEN Recovery anchor system is a cast-in stainless steel spherical head anchor, load class 20,0, on to which a freely pivoting standard lifting link is attached.

A securing-bolt is provided to prevent unintentional removal of the lifting link. An additional chain protects the clutch against theft.

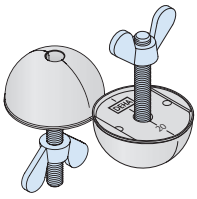
Components of the accident recovery unit

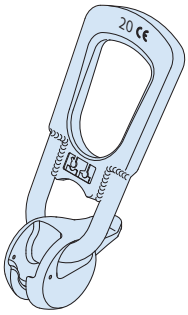
Description	HALFEN Article name	HALFEN Order number
Spherical head lifting anchor, stainless steel, load class 20,0	6000-20,0-0180 A4	0735.009-00003
Recess former round, with threaded rod and butterfly-nut	6232 – 20,0①	0736.020-00008
Lifting device with hole and safety clamp to prevent theft (without chain)	6104 – 20,0	0738.070-00001
Chain (anti-theft)	provided on-site	
Anchor plate with head bolt / U-bar, weldable	provided on-site	

① The recess formers are re-usable. Please order the minimum number required for one production sequence.

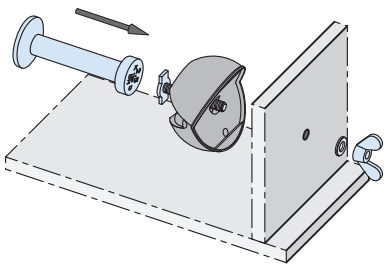


Spherical head lifting anchor

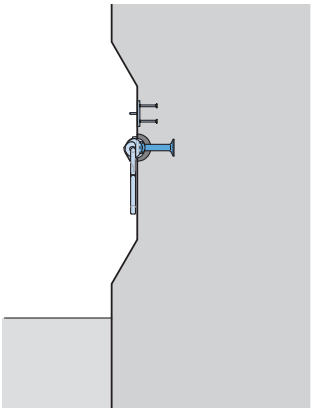

Recess former with threaded rod and wing-nut



Lifting device with hole for safety clamp (Universal head lifting link 6104–20,0)


The spherical head lifting anchor is fixed together with the recess former to the formwork

Installed lifting link without safety chain


Horizontal section with installed anchor

DEHA Lift-assembly-set

The HALFEN Lift-assembly-set is used to facilitate the installation of lifts and lift components. After initial installation the HALFEN Lift-set-box is perfect for up-grade and maintenance work.

The pre-assembled box can be installed in machine rooms and in shaft heads where required to lift and install heavy components.

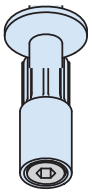
This system allows exact positioning of the drive motor in the machine-room. The system can also be used for initial installation of guide rails and other heavy lift components in the lift shaft.

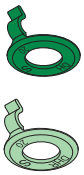
The HALFEN Lift-assembly-set consists of a cable loop, which is held in place with a safety bracket. The bracket is bolted to the ceiling with HALFEN Concrete bolts to prevent the cable loop from turning and loosening from the ceiling. This guarantees maximum safety when working in the lift shaft. The system has been used by renowned lift manufacturers for many years and provides the advantages of convenient assembly as well as being safety and time-efficient.

Lift-assembly-set

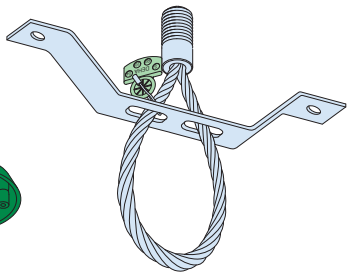
Axial load capacity [kN]		Article name	Order no. 0742.
	5.0	DLM-RD 12	200-00001
	12.0	DLM-RD 16	200-00002
	20.0	DLM-RD 20	200-00003
	25.0	DLM-RD 24	200-00004
	40.0	DLM-RD 20HD	200-00005

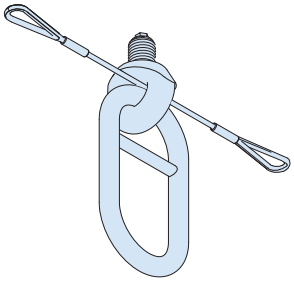

Crown anchor

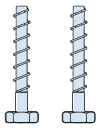

Short anchor

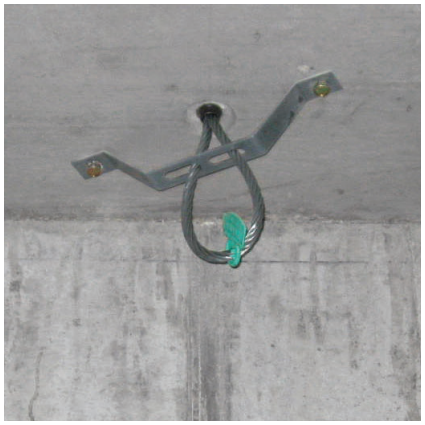

Identification cap

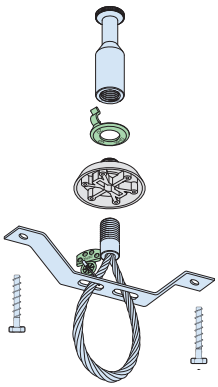

Nailing plate


Cable loop with securing bracket (5,0–25,0 kN)


HD lifting clutch with securing wire (40,0 kN)


HALFEN Concrete bolt


Cable loop installed in a lift head


Cable loop with securing bracket (5.0 – 25.0 kN)

CONTACT HALFEN WORLDWIDE

HALFEN is represented by subsidiaries in the following countries, please contact us!

Austria	HALFEN Gesellschaft m.b.H. Leonard-Bernstein-Str. 10 1220 Wien	Phone: +43-1-259 6770 E-Mail: office@halfen.at Internet: www.halfen.at	Fax: +43-1-259-677099
Belgium / Luxembourg	HALFEN N.V. Borkelstraat 131 2900 Schoten	Phone: +32-3-658 07 20 E-Mail: info@halfen.be Internet: www.halfen.be	Fax: +32-3-658 15 33
China	HALFEN Construction Accessories Distribution Co.Ltd. Room 601 Tower D, Vantone Centre No. A6 Chao Yang Men Wai Street Chaoyang District Beijing · P.R. China 100020	Phone: +86-10 5907 3200 E-Mail: info@halfen.cn Internet: www.halfen.cn	Fax: +86-10 5907 3218
Czech Republic	HALFEN s.r.o. Business Center Šafránkova Šafránkova 1238/1 155 00 Praha 5	Phone: +420 -311-690 060 E-Mail: info@halfen.cz Internet: www.halfen.cz	Fax: +420-235-314 308
France	HALFEN S.A.S. 18, rue Goubet 75019 Paris	Phone: +33-1- 44523100 E-Mail: halfen@halfen.fr Internet: www.halfen.fr	Fax: +33-1-44523152
Germany	HALFEN Vertriebsgesellschaft mbH Liebigstr. 14 40764 Langenfeld	Phone: +49-2173-970-0 E-Mail: info@halfen.de Internet: www.halfen.de	Fax: +49-2173-970225
Italy	HALFEN S.r.l. Soc. Unipersonale Via F.lli Bronzetti N° 28 24124 Bergamo	Phone: +39-035-0760711 E-Mail: tecnico@halfen.it Internet: www.halfen.it	Fax: +39-035-0760799
Netherlands	HALFEN b.v. Oostermaat 3 7623 CS Borne	Phone: +31-74-267 14 49 E-Mail: info@halfen.nl Internet: www.halfen.nl	Fax: +31-74-267 26 59
Norway	HALFEN AS Postboks 2080 4095 Stavanger	Phone: +47-51 82 34 00 E-Mail: post@halfen.no Internet: www.halfen.no	
Poland	HALFEN Sp. z o.o. Ul. Obornicka 287 60-691 Poznan	Phone: +48-61-622 14 14 E-Mail: info@halfen.pl Internet: www.halfen.pl	Fax: +48-61-622 14 15
Spain	HALFEN Spain PLAKABETON S.L. Polígono Industrial Santa Ana c/ Ignacio Zuloaga 20 28522 Rivas-Vaciamadrid	Phone: +34 916 669 181 E-Mail: info@halfen.es Internet: www.halfen.es	Fax: +34 916 669 661
Sweden	Halfen AB Vädursgatan 5 412 50 Göteborg	Phone: +46-31-98 58 00 E-Mail: info@halfen.se Internet: www.halfen.se	Fax: +46-31-98 58 01
Switzerland	HALFEN Swiss AG Hertistrasse 25 8304 Wallisellen	Phone: +41-44-849 78 78 E-Mail: info@halfen.ch Internet: www.halfen.ch	Fax: +41-44-849 78 79
United Kingdom / Ireland	HALFEN Ltd. A1/A2 Portland Close Houghton Regis LU5 5AW	Phone: +44 -1582- 47 03 00 E-Mail: info@halfen.co.uk Internet: www.halfen.co.uk	Fax: +44-1582-47 03 04
United States of America	HALFEN USA Inc. PO Box 18687 San Antonio TX 78218	Phone: +1 800.423.91 40 E-Mail: info@halfenusa.com Internet: www.halfenusa.com	Fax: +1 877.683.4910
For countries not listed **HALFEN International**	HALFEN International GmbH Liebigstr. 14 40764 Langenfeld / Germany	Phone: +49 -2173 -970-0 E-Mail: info@halfen.com Internet: www.halfen.com	Fax: +49 -2173 -970-849

HALFEN is represented with sales offices and distributors worldwide. Please contact us: www.halfen.com

NOTES REGARDING THIS CATALOGUE

Technical and design changes reserved. The information in this publication is based on state-of-the-art technology at the time of publication. We reserve the right to make technical and design changes at any time. HALFEN GmbH shall not accept liability for the accuracy of the information in this publication or for any printing errors.

The HALFEN GmbH subsidiaries in Germany, France, the Netherlands, Austria, Poland, Switzerland and the Czech Republic are Quality Management certified according to **ISO 9001:2015**, Certificate no. 202384-2016-AQ-GER-DAkkS.

HALFEN
YOUR BEST CONNECTIONS

PDF 03/18
T - 006 - E - 03/18