

DEHA LIFTING ANCHOR SYSTEM

TECHNICAL INFORMATION



DEHA LIFTING ANCHOR SYSTEM

KKT 08-E

CONCRETE

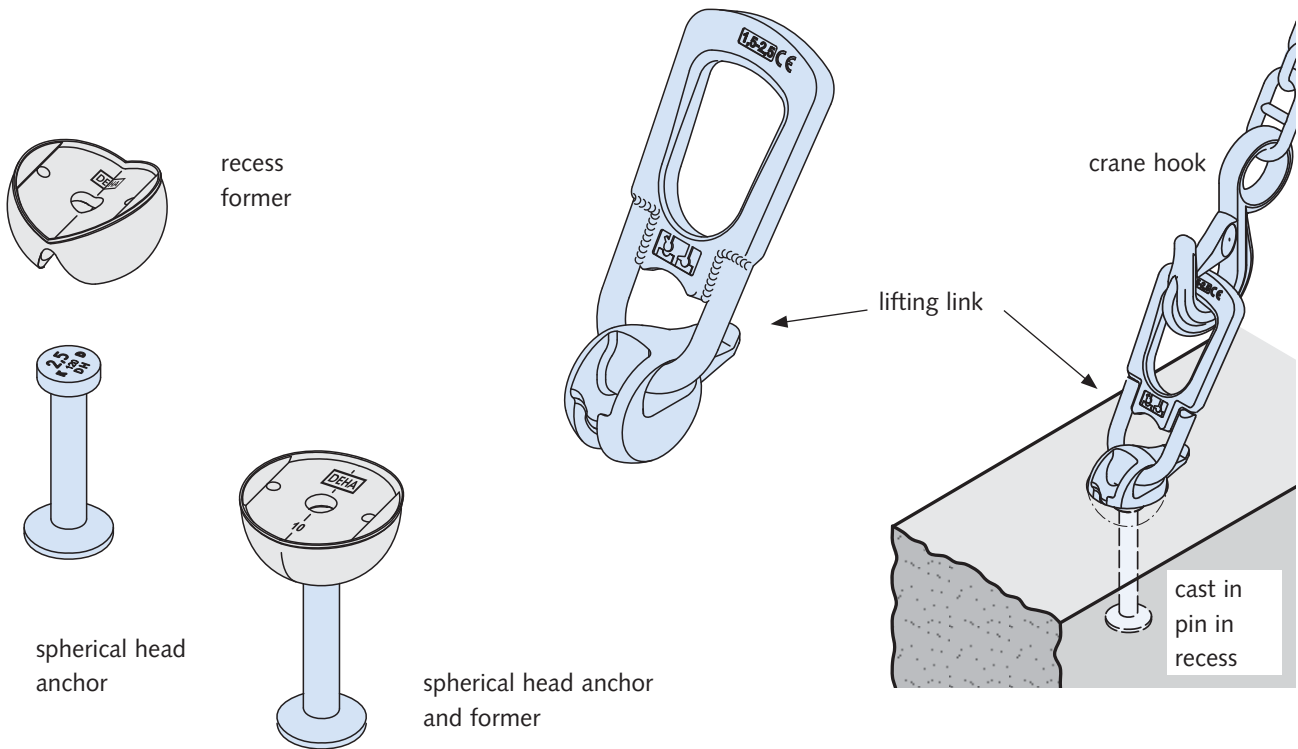


HALFEN-DEHA

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DEHA LIFTING ANCHOR SYSTEM

Introduction



This catalogue describes the KKT lifting system designed by Deha and used successfully for 40 years. The products are made under controlled conditions in our own factory and in accordance with our ISO accreditation.

The DEHA System consists of a cast in spherical head anchor (also known as a pin or "dog-bone") and a matching lifting link which quickly engages in the anchor ready for the crane hook.

The DEHA Anchors are made in a range of sizes for loads up to 45t grouped together with a lifting link for each classified group. There is an appropriate rubber recess former to ensure that the concrete is cast in the correct shape. DEHA-Anchors are clearly labelled with the load allowable to avoid mismatch or confusion and the recess ensures that a larger link cannot be engaged in a smaller anchor from a different classified group.

Precast concrete elements may be lifted several times after casting and during storage and erection – by using this system the designer and the works manager ensure that each lift is carried out safely and quickly. Failure to use a designed and co-ordinated system could result in material breakage at some point during the production/delivery process.

The DEHA System is enhanced by the factory QA system and Quality Control checks during the production. If necessary each order for lifting links can be sent out with a certificate referring back to test. In this way it is easy to maintain a safety file in the yard. Full technical data and how to order is shown in this catalogue. In particular designers should ensure that a calculation is made for each unit using the method shown on page 14.

Chart of Basic System Data		
Load group and lifting link designation	Range of anchor loads	Range of anchor lengths
1.3t	1.3t	35 mm to 240 mm
2.5t	2.5t	45 mm to 280 mm
5.0t	4.0t	70 mm to 340 mm
	5.0t	75 mm to 480 mm
10.0t	7.5t	100 mm to 540 mm
	10.0t	115 mm to 680 mm
	15.0t	140 mm to 840 mm
20.0t	20.0t	180 mm to 1000 mm
	32.0t	200 mm to 1200 mm
45.0t	45.0t	500 mm and 1200 mm

DEHA LIFTING ANCHOR SYSTEM

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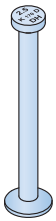
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DEHA LIFTING ANCHOR SYSTEM

System - Overview

DEHA Spherical Head Anchors

Spherical Head Anchor Standard version



- Applications::**
Columns, beams, slabs, walls, panels, pipes
- Parameter:**
- thickness of element
 - concrete strength
 - reinforcement

Spherical Head Rod Anchor Standard version



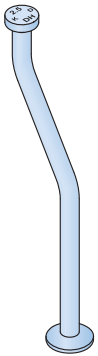
- Applications::**
Thin walls prefabricated, brick-walls
- Parameter:**
- thickness of element
 - concrete strength
 - reinforcement

Narrow Foot Spherical Head Anchor



- Applications::**
Prestressed beams with thin webs
- Parameter:**
- thickness of element
 - concrete strength
 - reinforcement

Offset Spherical Head Anchor



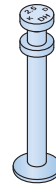
- Applications:**
Sandwich panels
- Parameter:**
- thickness of element
 - concrete strength
 - reinforcement

Offset Spherical Head Rod Anchor



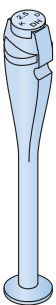
- Applications:**
Thin sandwich elements
- Parameter:**
- thickness of element
 - concrete strength
 - reinforcement

Quick Fitting Spherical Head Anchor DSM



- Applications:**
Precast elements with anchor position at hardly accessible places
- Parameter:**
- thickness of element
 - concrete strength
 - reinforcement

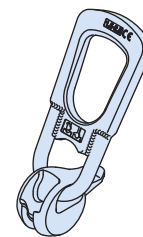
Spherical Head Tilt-up Anchor



- Applications:**
Thin elements to be pitched
- Parameter:**
- thickness of element
 - concrete strength
 - reinforcement

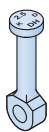
DEHA Lifting Links

Universal Head Lifting Link



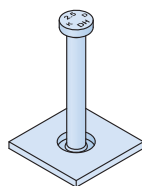
- Lifting tool for all types of Spherical Head Anchors in load groups 1.3 - 45.0 t

Spherical Head Eye Anchor



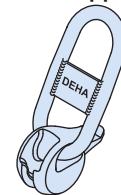
- Applications::**
Prestressed beams; thin elements; low concrete strength
- Parameter:**
- thickness of element
 - concrete strength
 - reinforcement

Spherical Head Plate Anchor



- Applications:**
Thin floor slabs with big area and weight, i.e: prefabricated garages
- Parameter:**
- thickness of element
 - concrete strength
 - reinforcement

Small Universal Head Lifting Link for limited applications



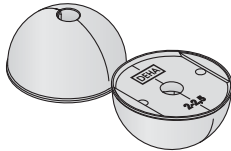
- Lifting tool for all types of Spherical Head Anchors in load groups 1.3 - 10.0 t

DEHA LIFTING ANCHOR SYSTEM

System - Overview

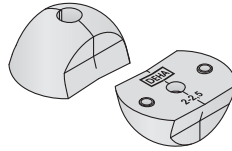
DEHA Recess formers and accessories

Rubber recess former, round shape



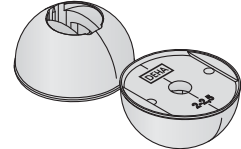
Material: rubber
Applications: for all anchors except tilt-up anchors and DSM
Features: durable and resistant against oil.

Rubber recess former, narrow shape



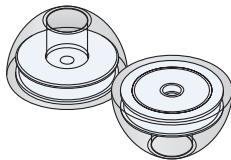
Material: rubber
Applications: for all anchors except tilt-up anchors and DSM
Features: to form the recess in very thin wall panels. Durable and resistant against oil.

Rubber recess former, round shape, for tilt-up anchor 6006



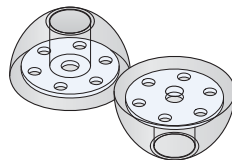
Material: rubber
Applications: only for tilt-up anchors
Features: Allows pitching with the Universal Head Lifting Link. Durable and resistant against oil.

Magnetic recess former for DSM



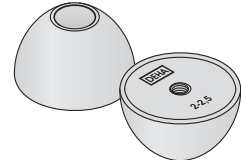
Material: Polyurethane
Applications: for quick fitting lifting anchor DSM
Features: magnetic, no need to open, highly durable and resistant against oil

Polyurethane recess former for DSM



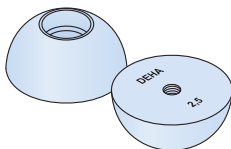
Material: Polyurethane
Applications: for quick fitting lifting anchor DSM
Features: no need to open, highly durable and resistant against oil

Rubber recess former for DSM



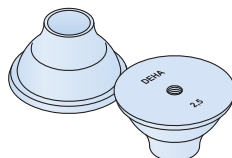
Material: rubber
Applications: for Quick Fitting Spherical Head Anchor DSM
Features: no need to open, durable and resistant against oil

Steel recess former, round shape



Material: steel
Applications: for all anchors except tilt-up anchors and DSM
Features: highly durable. Installed with rubber grommet

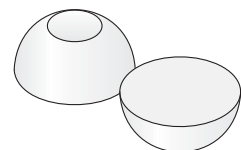
Trumpet steel recess former



Material: steel
Applications: for all anchors except tilt-up anchors and DSM
Features: highly durable, resists high loads during pouring. Installed with rubber grommet

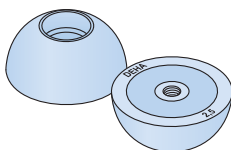
Recess void filler

Recess void filler, Polystyrene



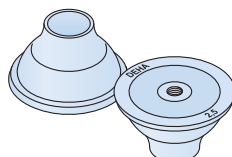
To provide temporary protection to the recess from dirt/ice while the concrete is in store. For load groups 1.3 - 20.0 t

Magnetic steel recess former, round shape



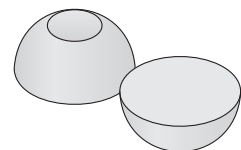
Material: steel
Applications: for all anchors except tilt-up anchors and DSM
Features: magnetic, highly durable. Installed with rubber grommet

Magnetic trumpet steel recess former



Material: steel
Applications: for all anchors except tilt-up anchors and DSM
Features: magnetic, highly durable, resists high loads during pouring. Installed with rubber grommet

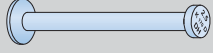
Recess void filler, fibre reinforced concrete VKF

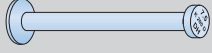


For final closing of the recess in the concrete. Made from grey fibre reinforced concrete. Watertight up to 5 bar with the special glue. Fitting for load groups 7.5 - 45.0 t

DEHA LIFTING ANCHOR SYSTEM

Selection Chart - Anchors


Spherical Head Anchor: Load group 1.3 - 5.0				
Load group				
	mill finish		hot-dip galvanised	
	Designation	Order no. 0735.010-	Designation	Order no. 0735.-
1.3	• 6000-1.3-0040	00002	6000-1.3-0040 FV	200-00067
	• 6000-1.3-0050	00003	6000-1.3-0050 FV	200-00068
	• 6000-1.3-0055	00004	6000-1.3-0055 FV	200-00069
	• 6000-1.3-0065	00005	6000-1.3-0065 FV	200-00070
	• 6000-1.3-0085	00006	6000-1.3-0085 FV	200-00071
	• 6000-1.3-0120	00007	6000-1.3-0120 FV	200-00072
	• 6000-1.3-0240	00008	6000-1.3-0240 FV	200-00073
2.5	• 6000-2.5-0045	00015	6000-2.5-0045 FV	200-00080
	• 6000-2.5-0055	00016	6000-2.5-0055 FV	200-00081
	• 6000-2.5-0065	00017	6000-2.5-0065 FV	200-00082
	• 6000-2.5-0075	00189	6000-2.5-0075 FV	200-00156
	• 6000-2.5-0085	00018	6000-2.5-0085 FV	200-00083
	• 6000-2.5-0120	00019	6000-2.5-0120 FV	200-00084
	• 6000-2.5-0170	00020	6000-2.5-0170 FV	200-00085
	• 6000-2.5-0210	00021	6000-2.5-0210 FV	200-00086
• 6000-2.5-0280	00022	6000-2.5-0280 FV	200-00087	
4.0	• 6000-4.0-0075	00023	6000-4.0-0075 FV	200-00088
	• 6000-4.0-0100	00024	6000-4.0-0100 FV	200-00089
	• 6000-4.0-0120	00025	6000-4.0-0120 FV	200-00090
	• 6000-4.0-0170	00027	6000-4.0-0170 FV	200-00091
	• 6000-4.0-0210	00028	6000-4.0-0210 FV	200-00092
	• 6000-4.0-0240	00029	6000-4.0-0240 FV	200-00093
	• 6000-4.0-0340	00030	6000-4.0-0340 FV	200-00094
5.0	• 6000-5.0-0065	00033	6000-5.0-0065 FV	200-00096
	• 6000-5.0-0075	00034	6000-5.0-0075 FV	200-00097
	• 6000-5.0-0085	00035	6000-5.0-0085 FV	200-00098
	• 6000-5.0-0095	00036	6000-5.0-0095 FV	010-00172
	• 6000-5.0-0120	00038	6000-5.0-0120 FV	200-00100
	• 6000-5.0-0180	00039	6000-5.0-0180 FV	200-00101
	• 6000-5.0-0210	00173	6000-5.0-0210 FV	200-00102
	• 6000-5.0-0240	00040	6000-5.0-0240 FV	010-00174
	• 6000-5.0-0340	00041	6000-5.0-0340 FV	200-00104
	• 6000-5.0-0480	00042	6000-5.0-0480 FV	200-00105
Load group	stainless steel			
	Designation	Order no.		
1.3	• 6000-01.3-0065 A4	0735.010-00130		
1.3	• 6000-01.3-0085 A4	0735.010-00131		
1.3	• 6000-01.3-0120 A4	0735.010-00132		
2.5	• 6000-02.5-0120 A4	0735.010-00137		
2.5	• 6000-02.5-0170 A4	0735.010-00138		
5.0	• 6000-05.0-0120 A4	0735.010-00144		
5.0	• 6000-05.0-0180 A4	0735.010-00145		
5.0	• 6000-05.0-0240 A4	0735.010-00146		


Spherical Head Anchor: Load group 7.5 - 45.0				
Load group				
	mill finish		hot-dip galvanised	
	Designation	Order no. 0735.010-	Designation	Order no. 0735.-
7.5	• 6000- 7.5-0100	00043	6000- 7.5-0100 FV	200-00106
	• 6000- 7.5-0120	00046	6000- 7.5-0120 FV	200-00107
	• 6000- 7.5-0140	00047	6000- 7.5-0140 FV	200-00108
	• 6000- 7.5-0165	00049	6000- 7.5-0165 FV	200-00110
	• 6000- 7.5-0200	00050	6000- 7.5-0200 FV	200-00111
	• 6000- 7.5-0300	00051	6000- 7.5-0300 FV	010-00188
	• 6000- 7.5-0540	00052	6000- 7.5-0540 FV	200-00113
	10	• 6000-10.0-0115	00054	6000-10.0-0115 FV
• 6000-10.0-0135		00056	6000-10.0-0135 FV	200-00117
• 6000-10.0-0150		00057	6000-10.0-0150 FV	200-00118
• 6000-10.0-0170		00058	6000-10.0-0170 FV	200-00119
• 6000-10.0-0250		00060	6000-10.0-0250 FV	200-00120
• 6000-10.0-0340		00061	6000-10.0-0340 FV	200-00121
• 6000-10.0-0680		00062	6000-10.0-0680 FV	200-00123
15		• 6000-15.0-0140	00063	6000-15.0-0140 FV
	• 6000-15.0-0165	00064	6000-15.0-0165 FV	200-00125
	• 6000-15.0-0200	00065	6000-15.0-0200 FV	200-00126
	• 6000-15.0-0300	00066	6000-15.0-0300 FV	200-00127
	• 6000-15.0-0400	00067	6000-15.0-0400 FV	200-00128
	• 6000-15.0-0840	00068	6000-15.0-0840 FV	200-00129
	20	• 6000-20.0-0180	00168	-
• 6000-20.0-0200		00070	6000-20.0-0200 FV	200-00131
• 6000-20.0-0240		00071	6000-20.0-0240 FV	200-00132
• 6000-20.0-0340		00074	6000-20.0-0340 FV	200-00134
• 6000-20.0-0500		00075	6000-20.0-0500 FV	200-00135
• 6000-20.0-1000		00076	6000-20.0-1000 FV	200-00136
32		• 6000-32.0-0200	00077	6000-32.0-0200 FV
	• 6000-32.0-0250	00078	6000-32.0-0250 FV	200-00138
	• 6000-32.0-0280	00079	6000-32.0-0280 FV	200-00139
	• 6000-32.0-0320	00080	6000-32.0-0320 FV	200-00140
	• 6000-32.0-0700	00082	6000-32.0-0700 FV	200-00142
45	• 6000-32.0-1200	00083	6000-32.0-1200 FV	200-00143
	• 6000-45.0-0500	00197	-	-
	• 6000-45.0-1200	00159	-	-

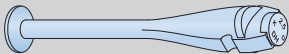
① Items marked with (*), are shown in load chart.
Other length and stainless steel anchors on request.


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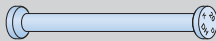
Selection Chart - Anchors - Carbonsteel


Spherical Head Rod Anchor				
Load group				
	mill finish		hot-dip galvanised	
	Designation	Order no. 0735.070-	Designation	Order no. 0735.200-
2.5	6050- 2.5-0400	00002	6050- 2.5-0400 FV	00158
	6050- 2.5-0520	00003	-	-
4.0	6050- 4.0-0510	00004	-	-
	6050- 4.0-0720	00005	-	-
5.0	6050- 5.0-0580	00007	6050- 5.0-0580 FV	00159
	6050- 5.0-0900	00008	-	-
7.5	6050- 7.5-0750	00009	-	-
	6050- 7.5-1150	00010	-	-
10.0	6050-10.0-0870	00011	-	-
	6050-10.0-1300	00012	-	-
15.0	6050-15.0-1080	00013	-	-
	6050-15.0-1550	00014	-	-

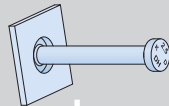
Offset Spherical Head Rod Anchor				
Load group				
	mill finish		hot-dip galvanised	
	Designation	Order no. 0735.080-	Designation	Order no. 0735.200-
2.5	6052- 2.5-0508	00002	on request	
5.0	6052- 5.0-0885	00003		
7.5	6052- 7.5-1134	00004		
10.0	6052-10.0-1284	00005		
15.0	6052-15.0-1535	00006		

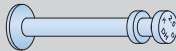
Spherical Head Tilt-up Anchor				
Load group				
	mill finish		hot-dip galvanised	
	Designation	Order no. 0735.120-	Designation	Order no. 0735.200-
2.5	6006-2.5-0240	00001	6006-2.5-0240 FV	00151
5.0	6006-5.0-0240	00002	6006-5.0-0240 FV	00152

Spherical Head Eye Anchor				
Load group				
	mill finish		hot-dip galvanised	
	Designation	Order no. 0735.050-	Designation	Order no. 0735.200-
1.3	6001- 1.3-0065	00001	6001- 1.3-0065 FV	00061
2.5	6001- 2.5-0090	00002	6001- 2.5-0090 FV	00062
5.0	6001- 5.0-0120	00003	6001- 5.0-0120 FV	00063
10.0	6001-10.0-0180	00004	6001-10.0-0180 FV	00064
20.0	6001-20.0-0250	00005	6001-20.0-0250 FV	00065

Narrow Foot Spherical Head Anchor				
Load group				
	mill finish		hot-dip galvanised	
	Designation	Order no. 0735.018-	Designation	Order no. 0735.208-
10.0	6000-10.0-0340D	00056	6000-10.0-0340D FV	00056
15.0	6000-15.0-0400D	00057	6000-15.0-0400D FV	00057
20.0	6000-20.0-0500D	00067	6000-20.0-0500D FV	00067
32.0	6000-32.0-0700D	00058	6000-32.0-0700D FV	00058

Offset Spherical Head Anchor				
Load group				
	mill finish		hot-dip galvanised	
	Designation	Order no. 0735.030-	Designation	Order no. 0735.200-
1.3	6002- 1.3-0227	00001	6002- 1.3-0227 FV	00053
2.5	6002- 2.5-0268	00002	6002- 2.5-0268 FV	00054
4.0	6002- 4.0-0406	00003	6002- 4.0-0406 FV	00055
5.0	6002- 5.0-0466	00004	6002- 5.0-0466 FV	00056
7.5	6002- 7.5-0644	00005	6002- 7.5-0644 FV	00057
10.0	6002-10.0-0667	00006	6002-10.0-0667 FV	00058
15.0	6002-15.0-0825	00007	6002-15.0-0825 FV	00059
20.0	6002-20.0-0986	00008	6002-20.0-0986 FV	00060

Spherical Head Plate Anchor				
Load group				
	mill finish		hot-dip galvanised	
	Designation	Order no. 0735.060-	Designation	Order no. 0735.200-
2.5	6010- 2.5-0055	00001	6010- 2.5-0055 FV	00043
	6010- 2.5-0120	00002	6010- 2.5-0120 FV	00044
5.0	6010- 5.0-0065	00004	6010- 5.0-0065 FV	00046
	6010- 5.0-0110	00007	6010- 5.0-0110 FV	00047
10.0	6010-10.0-0115	00009	6010-10.0-0115 FV	00048
	6010-10.0-0150	00011	6010-10.0-0150 FV	00172

Quick Fitting Spherical Head Anchor DSM				
Load group				
	mill finish		hot-dip galvanised	
	Designation	Order no. 0735.110-	Designation	Order no. 0735.200-
1.3	6073-1.3-0065	00005	6073-1.3-0065 FV	00001
	6073-1.3-0120	00004	6073-1.3-0120 FV	00002
2.5	6073-2.5-0085	00001	6073-2.5-0085 FV	00003
	6073-2.5-0120	00002	6073-2.5-0120 FV	00004
	6073-2.5-0170	00003	6073-2.5-0170 FV	00005
5.0	6073-5.0-0110	00006	6073-5.0-0110 FV	00006
	6073-5.0-0240	00007	6073-5.0-0240 FV	00007

DEHA LIFTING ANCHOR SYSTEM

Selection Chart - Recess Formers

DEHA Rubber Recess Formers												
Load group	round design						narrow design					
	incl. plate with threaded rod		incl. plate with socket		without steel parts		incl. plate with threaded rod		incl. plate with socket		without steel parts	
	Designation	Order no. 0736.020-	Designation	Order no. 0736.030-	Designation	Order no. 0736.010-	Designation	Order no. 0736.070-	Designation	Order no. 0736.080-	Designation	Order no. 0736.060-
1.3	6132-1.3	00001	6133-1.3	00001	6131-1.3	00001	6138-1.3	00001	6145-1.3	00001	6137-1.3	00001
2.5	6132-2.5	00002	6133-2.5	00002	6131-2.5	00002	6138-2.5	00002	6145-2.5	00002	6137-2.5	00002
4.0	6132-4.0	00003	6133-4.0	00003	6131-4.0	00003	6138-4.0	00003	6145-4.0	00003	6137-4.0	00003
5.0	6132-5.0	00004	6133-5.0	00004	6131-5.0	00004	6138-5.0	00004	6145-5.0	00004	6137-5.0	00004
7.5	6132-7.5	00005	6133-7.5	00005	6131-7.5	00005	6138-7.5	00005	6145-7.5	00005	6137-7.5	00005
10.0	6132-10	00006	6133-10	00006	6131-10	00006	6138-10	00006	6145-10	00006	6137-10	00006
15.0	6132-15	00007	6133-15	00007	6131-15	00007	6138-15	00007	6145-15	00007	6137-15	00007
20.0	6132-20	00008	6133-20	00008	6131-20	00008	6138-20	00008	6145-20	00008	6137-20	00008
32.0	6132-32	00009	6133-32	00009	6131-32	00009	-	-	-	-	-	-
45.0												

DEHA Recess Formers								Recess Void Filler				
Load group	for Spherical Head Pitching Anchor		for Quick Fitting Anchor				Polystyrene		Fibre-reinforced light-weight concrete			
	Rubber, round		Polyurethane with magnet		Polyurethane		Rubber					
	Designation	Order no. 0736.150-	Designation	Order no. 0736.190-	Designation	Order no. 0736.170-	Designation	Order no. 0736.140-	Designation	Order no. 0737.010-	Designation	Order no. 0737.120-
1.3	-	-	6126-1.3	00001	6133-1.3	00002	6128-1.3	00001	6015-1.3	00001	-	-
2.5	6134-2.5	00001	6126-2.5	00002	6133-2.5	00001	6128-2.5	00002	6015-2.5	00002	-	-
4.0	-	-	-	-	-	-	-	-	6015-4.0/5.0	00003	-	-
5.0	6134-5.0	00002	6126-5.0	00003	-	-	6128-5.0	00003		-	-	-
7.5	-	-	-	-	-	-	-	-	6015-7.5/10	00004	6172-10	00001
10.0	-	-	-	-	-	-	-	-		-	-	-
15.0	-	-	-	-	-	-	-	-	6015-15/20	00005	6172-20	00002
20.0	-	-	-	-	-	-	-	-		-	-	-
32.0	-	-	-	-	-	-	-	-	-	-	6172-32	00003
45.0	-	-	-	-	-	-	-	-	-	-	-	-

DEHA LIFTING ANCHOR SYSTEM

Selection Chart - Recess Formers - Lifting Links

DEHA Steel Recess Formers										DEHA Lifting Links			
Load group	Round shape		Trumpet shape		Round shape with magnet		Trumpet shape with magnet		Universal Head Lifting Link UKK		Small Universal Head Lifting Link for limited applications		
	Designation	Order no. 0736.100-	Designation	Order no. 0736.120-	Designation	Order no. 0736.110-	Designation	Order no. 0736.130-	Designation	Order no. 0738.010-	Designation	Order no. 0738.020-	
1.3	6150-1.3	00001	6152-1.3	00001	6150-1.3 M	00001	6152-1.3 M	00001	6102-1.0/1.3	00001	6109-1.3	00001	
2.5	6150-2.5	00002	6152-2.5	00002	6150-2.5 M	00002	6152-2.5 M	00002	6102-1.5/2.5	00002	6109-1.5/2.5	00002	
4.0	-	-	6152-4.0/5.0	00003	-	-	6152-4.0 M	00003	6102-3.0/5.0	00003	6109-4.0/5.0	00003	
5.0	6150-5.0	00003			6150-5.0 M	00003	6152-5.0 M	00004					
7.5	-	-	-	-	-	-	6152-7.5 M	00005	6102-6.0/10	00004	6109-7.5/10	00004	
10.0	-	-	-	-	-	-	-	-					
15.0	-	-	-	-	-	-	-	-	6102-12/20	00005	-	-	
20.0	-	-	-	-	-	-	-	-			-	-	
32.0	-	-	-	-	-	-	-	-	6102-32	00006	-	-	
45.0	-	-	-	-	-	-	-	-	6102-45	00007	-	-	

Accessories for DEHA Recess Former												
Load group	Rubber grommet		Double rubber grommet		Pitching plate		Plate with threaded rod		Plate with socket		Holding bolt with wing nut	
	Designation	Order no. 0737.060-	Designation	Order no. 0737.070-	Designation	Order no. 0737.050-	Designation	Order no. 0737.020-	Designation	Order no. 0737.040-	Designation	Order no. 0736.080-
1.3	6151-1.3	00001	6151-1.3 D	00001	6060-1.3	00001	6141-1.3	00001	6153-1.3	00001	6160-08	00001
2.5	6151-2.5	00002	6151-2.5 D	00002	-	-	6141-2.5	00002	6153-2.5	00002	6160-12	00002
4.0	-	-	6151-4.0 D	00003	-	-	6141-4.0/5.0	00003	6153-4.0/5.0	00003		
5.0	6151-5.0	00003	-	-	-	-						
7.5	6151-7.5	00004	6151-7.5 D	00004	-	-	6141-7.5/10	00004	6153-7.5/10	00004		
10.0	6151-10.0	00005	-	-	-	-	6141-15/20	00005	6153-15/20	00005	6160-16	00004
15.0	-	-	-	-	-	-						
20.0	-	-	-	-	-	-	6141-32	00006	6153-32	00006		
32.0	-	-	-	-	-	-						
45.0	-	-	-	-	-	-	-	-	-	-		

DEHA LIFTING ANCHOR SYSTEM

Safety

Guidance for lifting precast concrete elements

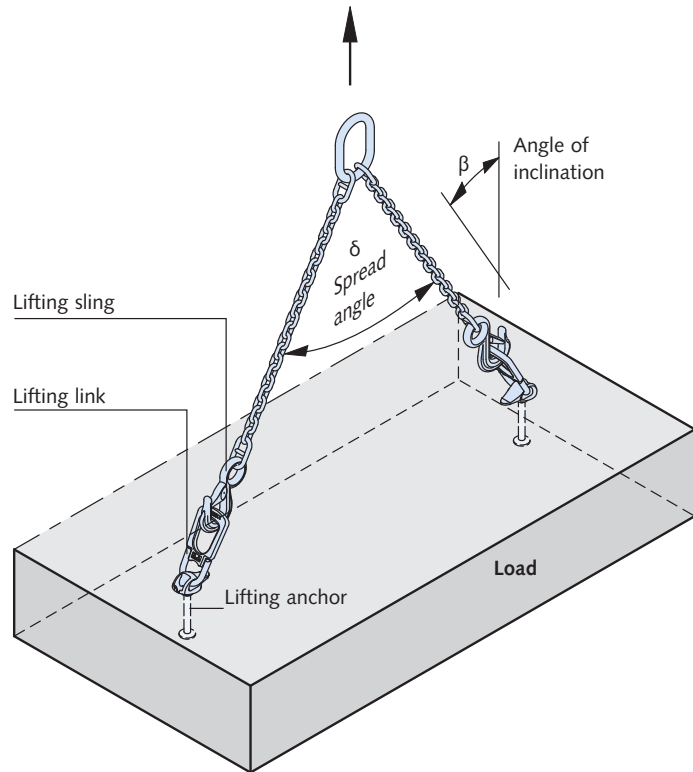
All anchors and lifting links must be designed, calculated and installed according to the instruction in this catalogue.

The system is only suitable for pre-casting, storing and erecting precast elements.

For long term use, such as counter weights, please consult Halfen.

The lifting link must be in a secure position during the lifting operation.

This literature is guidance for professional engineers/precasters, if in doubt, please ask.



The safety factors are for information only. Designers must make calculations as shown on page 14.

Safety rules

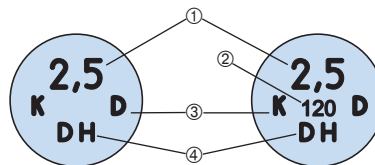
A lifting system consists of the anchors, permanently cast in and the temporarily attached lifting links. The German association of commercial and industrial workers compensation insurance carriers has issued "Safety rules for anchors and systems for lifting prefabricated concrete components" (BGR 106), which represent the generally acknowledged status of technology.

These safety rules require the following safety factors:

Safety factors	
Steel rupture of anchors:	$\gamma = 3$
Breakage concrete cone:	$\gamma = 2.5$
Failure of lifting links:	$\gamma = 4$

Identification

All DEHA anchors and lifting links are clearly marked for the user. The identification markings on the anchor are visible after casting: it is essential to check before installing the lifting link.



- ① load range (2.5 t)
- ② length of the anchor (120 mm)
- ③ usable for (K) UKK-lifter and (D) Turning and lifting link
- ④ DH means DEHA as manufacturer

Quality control

Factory quality control is carried out in accordance to DIN EN ISO 9001/2000.

Workmanship

Incorrectly installed lifting anchors or lifting links, or those with damaged parts, e.g. by corrosion, visible deformation etc. must not be used. Please contact Halfen Ltd. for details.

In order to ensure safe use of the DEHA Spherical Head lifting system, the installation instructions in this catalogue must be always available at place of use, i.e. in the precast yards and on site.

The production management and the site management have to ensure that the personnel are aware of, and have understood the installation and general safety regulations.

DEHA LIFTING ANCHOR SYSTEM

Design Considerations

Introduction

Permissible loads, edge distances and reinforcement are shown on tables in this catalogue.

Special lifting proposals can be provided by our technical department. Please contact Halfen.

Software downloads or catalogues can be found at www.halfen.com.

The anchors in each load group are offered in a range of designs to suit the concrete shape, whichever anchor is used, the factors used in the calculation are:

- weight of precast unit
- number of anchors
- positioning of anchors
- angle of lift β
- dynamic forces/crane factor
- adhesion to the mould

The allowance for adhesion to the mould, the angle of lift and the crane shock (dynamic load) are all in the actual design / selection. Concrete strength has to be assumed at time of lift.

Edge distances of the anchors is of less importance, as it can normally be solved by special reinforcement.

Weight of precast unit

A specific weight of 25 kN/m^3 is to be used as a basis for determining the weight $[G]$ of a fresh reinforced precast unit. Heavy concentration of reinforcement increases the weight and this should be taken into account by job engineer.

Adhesion to the mould

When the precast unit is first lifted out of the mould, the required force may be a multiple of the actual concrete weight. This is caused by suction, adhesion and friction between the mould and the concrete unit. From experience, one can calculate using the following adhesion forces:

Adhesion to the mould	
for smooth, oiled moulds	$q = 1 \text{ kN/m}^2$
for smooth, non-oiled moulds	$q = 2 \text{ kN/m}^2$
for rough moulds	$q = 3 \text{ kN/m}^2$

Adhesion:

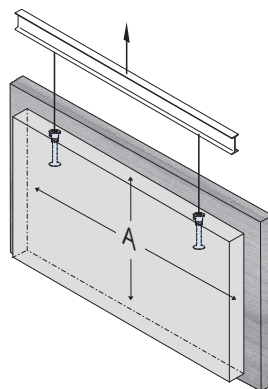
$$H_a = q \times A \text{ ①}$$

① base area of concrete element

π - slabs, ribbed slabs and waffled slabs cause more adhesion:

Increased adhesion factors	
π - slabs	$H_a = 2 \times G$
ribbed slabs	$H_a = 3 \times G$
waffled slabs	$H_a = 4 \times G$

Increased adhesion is caused by vertical parts of the mould that cannot be removed before lifting.



The adhesion should be minimized by removing as many parts of the mould as possible before lifting.

Dynamic forces

The size of the dynamic loading is mainly determined by the choice of the lifting equipment.

Cables made of steel or synthetic fibre have a damping effect. This effect increases with the increase of the cable length. In contrast, short chains have an adverse effect.

In unfavourable cases the forces acting on the lifting anchor should be calculated according to the following table.

Crane Factors		
Lift Equipment	Lifting Speed [m/min.]	Impact Factor ψ
Stationary Crane, Revolving Crane, Rail-mounted Crane	< 90	1.0 - 1,2
Stationary Crane, Revolving Crane, Rail-mounted Crane	≥ 90	1.3 - 1,4
Lifting and transporting with excavator on even ground	-	1.5 - 1,65
Lifting and transporting with excavator on uneven ground	-	≥ 2.0

Tensile forces at anchor

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

1. Lifting from the mould:

$$V_1 = G + H_a$$

2. Transporting:

$$V_2 = G \times f$$

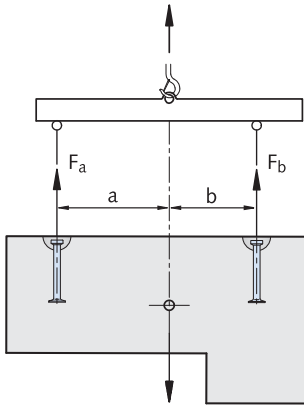
DEHA LIFTING ANCHOR SYSTEM

Design Considerations

Anchor positioned asymmetrically

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

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



The load always is searching its position with centre of gravity under the hook.

The real loads for two anchors under a spreader beam can be calculated as following:

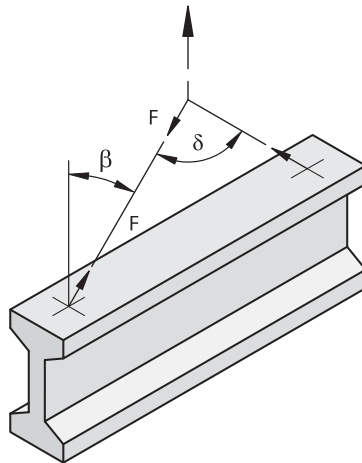
$$F_a = V_{ges} \times b / (a + b)$$

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

Angle of lift (β)

If a lifting sling is used in a triangle form, the acting forces on the anchors (sling loads) are increasing compared to simple vertical lifting. As the angle of lift (β) increases, the acting forces on the anchors and slings increase as well. This influence is taken into account by factor z dependent on angle β .

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



Information:

For avoiding sloped hanging position of the precast elements, the position of the hook at a spreader beam should be straight above the centre of gravity.

If lifting is executed without spreader beam, the anchors should be positioned symmetrically to the centre of gravity.

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

Resulting tension load affecting the anchor, if the anchors are positioned symmetrically:

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

n = number of working anchors

DEHA LIFTING ANCHOR SYSTEM

Design Considerations

Multiple slings

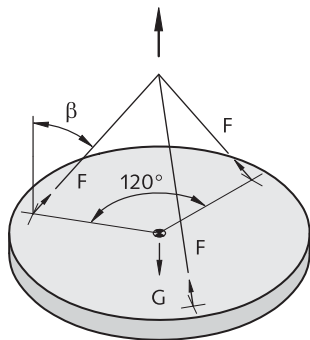
For a beam with more than two suspension points and for a panel with more than three, it is impossible to work out the load per anchor precisely, even if the anchors are arranged symmetrically to the load centre. Due to unavoidable tolerances in the suspension system and in the position of the anchors,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

The use of tolerance-compensating suspension systems (e.g. articulated lifting beam combinations, multiple slings with compensating rig, etc.) permits exact load distribution, but should only be used by experienced specialists, also bear in mind that such a system must be used both in yard and on site. In case of doubt, only two anchors should be assumed to be load bearing (BGR 500 Ch. 2.8 Point 3.5.3).

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

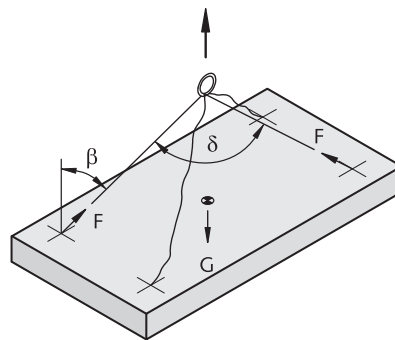
Examples:

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



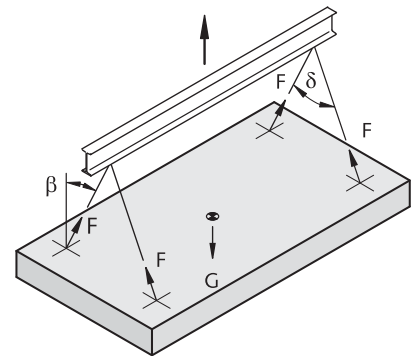
Number of load-bearing anchors:
n = 3

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



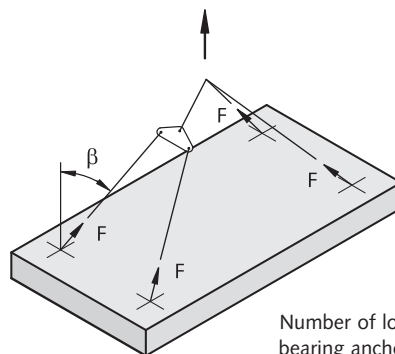
Number of load-bearing anchors:
n = 2

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



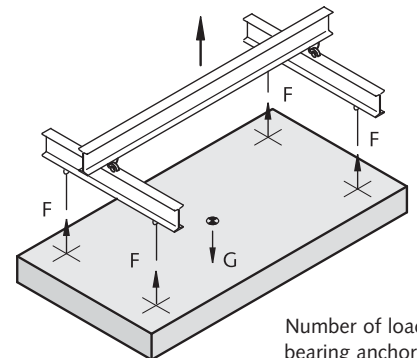
Number of load-bearing anchors:
n = 4

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



Number of load-bearing anchors:
n = 4

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



Number of load-bearing anchors:
n = 4

DEHA LIFTING ANCHOR SYSTEM

Calculation examples

Example slab unit

For selecting the anchor, a distinction can be made between the situation in the manufacturing yard and on the construction sites. Avoid selecting an anchor that is too large by including too many factors.

Example slab unit:

Lifting, transporting in the yard and on site

Lifting from the mould (demould):

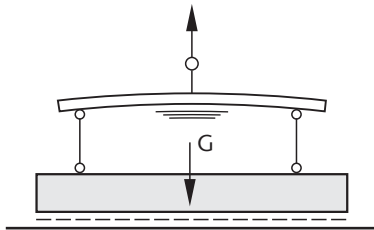
$$F = (G + q \times A) \times z / n$$

Transport in the yard:

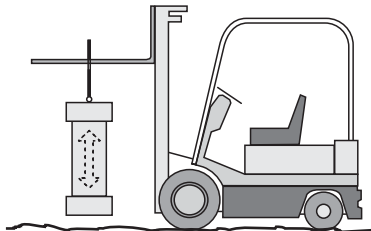
$$F = G \times f \times z / n$$

Transport on the site:

$$F = G \times f \times z / n$$



Adhesion to formwork



Lifting load

Calculation parameters for this example			
Example Slab unit	Manufacturing plant		On site
	Lifting	Transport	
G Mass	10 t (~ 100 kN)		10 t (~ 100 kN)
A Mould area	20 m ²		-
q Adhesion to formwork	2 kN/m ²	-	-
f Lifting load coefficient	-	1,1	1,4
z Cable angle factor	1.04 (β = 15°)		1,41 (β = 45°)
β_w Concrete strenght	15 N/mm ²		35 N/mm ²

With 2 supporting anchors, the angled pull force F per anchor is as follows:

Lifting from the mould (demould):

$$F = (100\text{kN} + 2 \text{ kN/m}^2 \times 20 \text{ m}^2) \times 1.04 / 2 = 72,8 \text{ kN}$$

Transport in the yard:

$$F = 100 \text{ kN} \times 1,1 \times 1.04 / 2 = 57,2 \text{ kN}$$

Transport on the site:

$$F = 100 \text{ kN} \times 1,4 \times 1,41 / 2 = 98,7 \text{ kN}$$

An anchor in the 10 t load range is just adequate.

If all detrimental factors were included, the result would be

$$F = (100\text{kN} + 20\text{m}^2 \times 2 \text{ kN/m}^2) \times 1,4 \times 1,41 / 2 = 138 \text{ kN}$$

e.g. an anchor in the load group 15 would have to be used.

The loads occurring on site are often higher than in the manufacturing plant as a result of greater cable spread and possibly higher crane factors. However the concrete strength is usually higher, i.e. the anchor's load capacity in the concrete is higher.

In the above example, the result for a lifting anchor would be as follows:

At the yard (β_w = 15 N/mm², cable angle 15°):

Angled pull 15° ≤ 30°

- full permissible load at angled pull, even with β_w = 15N/mm²

On the site (β_w = 35 N/mm², cable angle 45°):

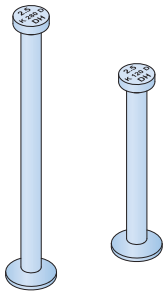
Angled pull 45° > 30°

- full permissible load at angled pull for concrete strength of β_w = 35 N/mm² > 23 N/mm², with angled pull reinforcement

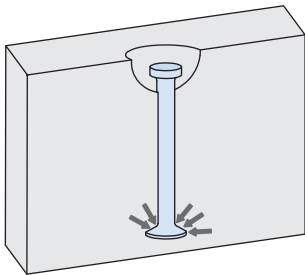
DEHA LIFTING ANCHOR SYSTEM

Anchor Technology

The Spherical Head anchor is forged from round material St 52-3 or stainless steel 1.4401 with load groups from 1.3 up to 32 t. Special anchors for higher loads are available. The anchors are available in different lengths, depending on their application. Longer anchors are used in reduced edge spacings or for low concrete strengths.



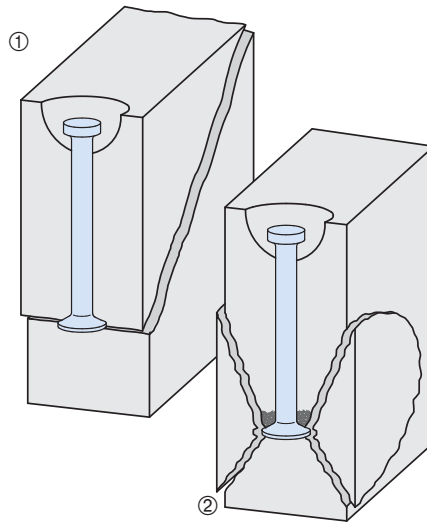
The load on the lifting anchor transfers to the concrete through the anchor foot. The anchor foot allows high permissible loading with short embedments.



Even in thin-walled elements, the load can be transmitted securely into the concrete. Due to the round symmetrical form of the anchor foot, no special positioning during anchor installation is required.

For typical wall thicknesses, the concentrated load distribution through the foot of the Spherical Head Anchor has advantages over the gradual, supposedly "gentle" load transfer of re-bar. Numerous tests, carried out at the Technical University in Darmstadt, have shown that beaking occurs in form of a cone, starting at the anchor foot. A larger section of concrete is activated by using longer anchors with larger embedment.

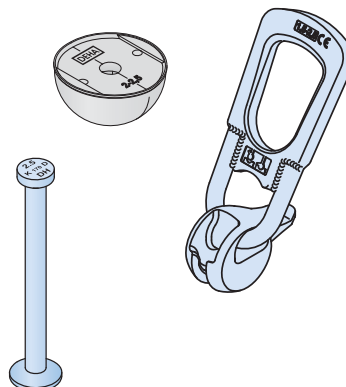
The length of the Spherical Head Anchor is designed for optimum loading depending on concrete cross-section and strength.



① Expected type of failure

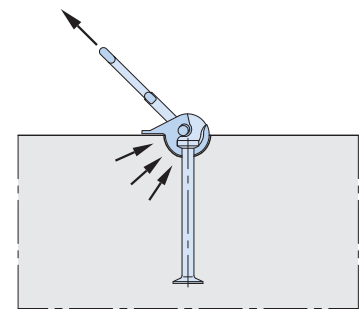
② This failure will not occur.

The Spherical Head Anchors must be installed in the mould by using DEHA Recess Formers. The recess former retains the anchor securely in position during the concrete pour. After removal the recess former leaves a void which corresponds exactly to the DEHA Lifting Link.



⚠ Modifications and welding to the DEHA Spherical Head Anchors, especially in the zone of forging at the head and foot, is not permitted.

The incorrect coupling of parts of different Load group is therefore impossible. Further advantages are that the Lifting Link rests against the concrete during diagonal pull and therefore transfers the horizontal load directly into the concrete.



For this reason, no reduction of loadbearing capacity is required for large units. Additional reinforcement for this application is not required. Additional reinforcement is required for angled pull in thin walled units. Details see page 16 "Angled pull stirrup".

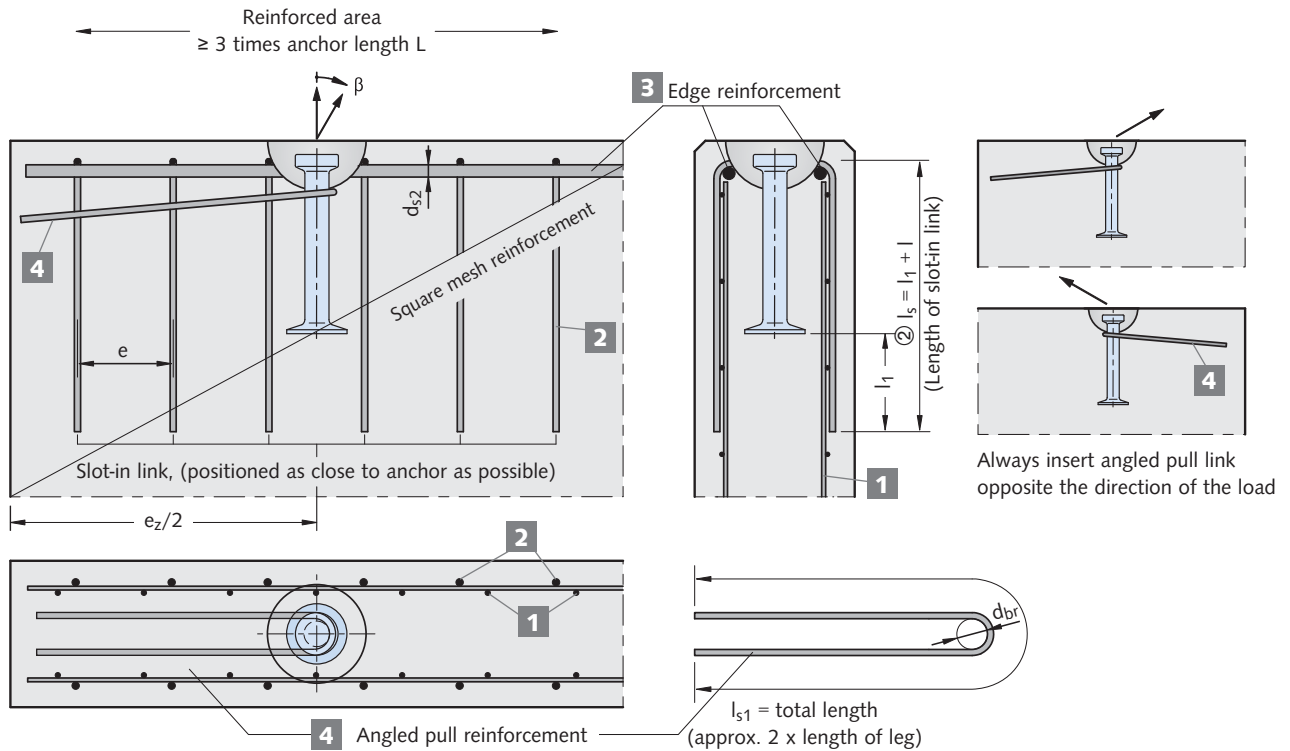
In case of transverse pull up to 90° to the slab plane, i.e. when pitching a wall unit upright, components may be required for thin slabs using for example a Turning Plate or Spherical Head Tilt-up Anchor (Load group 2.5 and 5.0).

We recommend the use of a tilting table to turn wall units upright. Sandwich panels can be turned upright by using the Offset Spherical Head -Anchor. Details see page 28.

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Anchor - Installation/Dimensions

Walls - additional reinforcement for the anchors



⚠ The angled pull reinforcement must be placed as close as possible under the recess former and installed with full contact to the anchor.

For this reason the bend radius must be tight i.e. the normal standard can be ignored.

The normal reinforcement in the unit may be suitable for the lifting anchor but please check the chart below.

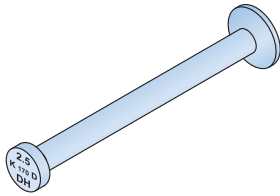
Load group	Reinforcement in walls											
	1 ①	2 ①②③						3 ①		4 ④⑤		
	Square mesh reinforcement	Slot-in link						Edge reinforcement both sides BST 500 S	Angled pull stirrup			
		[mm ² /m]	BST 500 S			BST 500 S			BST 500 S			
		for axial pull ≤ 30° [β]			for angled pull > 30° [β]			both sides	d _{s1} [mm]	d _{br1} [mm]	l _{s1} [mm]	
	Stück	d _s [mm]	l ₁ [mm]	Stück	d _s [mm]	l ₁ [mm]	d _{s2} [mm]					
1.3	2 × 66	2	Ø6	300	2	Ø6	450	Ø10	Ø8	25	800	
2.5	2 × 131	2	Ø8	610	4	Ø8	610	Ø10	Ø10	25	1500	
4.0	2 × 131	2	Ø8	610	4	Ø8	610	Ø10	Ø12	30	1600	
5.0	2 × 188	2	Ø10	720	4	Ø10	720	Ø12	Ø14	35	2000	
7.5	2 × 188	4	Ø10	720	6	Ø10	720	Ø12	Ø16	40	2300	
10.0	2 × 188	4	Ø10	720	8	Ø10	720	Ø14	Ø20	50	2600	
15.0	2 × 257	4	Ø12	800	6	Ø12	1000	Ø14	Ø25	80	3000	
20.0	2 × 378	6	Ø12	1000	10	Ø12	1000	Ø16	2 × Ø25	80	3000	
32.0	2 × 513	8	Ø12	1000	10	Ø14	1100	Ø16	2 × Ø25	80	3000	

① with very thin panels ($2 \times e_r \leq 70$) the square mesh can be taken together in one layer (example $2 \times 66 \text{ mm}^2/\text{m}$ required, lay $1 \times 132 \text{ mm}^2/\text{m}$ in the middle). The slot in links in this case can be placed on the skew, but the edge reinforcement must be placed on both sides of the anchor.
 ② The length of the link (l_s) = length of the anchor (l) + the dimension in the chart above (l_1).
 ③ The slot-in links should be spaced out each side of the anchor in a zone $2.5 \times$ the anchor length, but the first each side must be as close as possible to the recess former.
 ④ Angled pull reinforcement is only needed if $\beta > 30^\circ$. Angled pull reinforcement, may not be required if the edge distance is greater (see the following charts).
 ⑤ If the dimension of the precast element restrict the length of angled pull reinforcement, then the bar may be bent vertically up to the last 40% of the length.

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Anchor - Installation/Dimensions

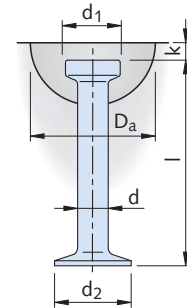
Walls and beams - anchor dimensions



The Spherical Head Anchor consists of a round steel rod with a forged foot and head.

Min. end edge distance is $0.5 e_z$. This may be reduced, if the unit is specially reinforced.

Carbon steel (for stainless please consult Halfen)



Dimensions, Spherical Head Anchor

Load group	Designation mill finish	Order No. 0735.010-	Designation hot-dip galvanised	Order No.. 0735.-	l [mm]	d [mm]	d ₁ [mm]	d ₂ [mm]	k [mm]	D _a [mm]
1.3	6000- 1.3-0085	00006	6000- 1.3-0085 FV	200-00071	85	10	19	25	10	60
	6000- 1.3-0120	00007	6000- 1.3-0120 FV	200-00072	120					
	6000- 1.3-0240	00008	6000- 1.3-0240 FV	200-00073	240					
2.5	6000- 2.5-0120	00019	6000- 2.5-0120 FV	200-00084	120	14	26	35	11	74
	6000- 2.5-0170	00020	6000- 2.5-0170 FV	200-00085	170					
	6000- 2.5-0280	00022	6000- 2.5-0280 FV	200-00087	280					
4.0	6000- 4.0-0170	00027	6000- 4.0-0170 FV	200-00091	170	18	36	45	15	94
	6000- 4.0-0240	00029	6000- 4.0-0240 FV	200-00093	240					
	6000- 4.0-0340	00030	6000- 4.0-0340 FV	200-00094	340					
5.0	6000- 5.0-0240	00040	6000- 5.0-0240 FV	010-00174	240	20	36	50	15	94
	6000- 5.0-0340	00041	6000- 5.0-0340 FV	200-00104	340					
	6000- 5.0-0480	00042	6000- 5.0-0480 FV	200-00105	480					
7.5	6000- 7.5-0200	00050	6000- 7.5-0200 FV	200-00111	200	24	46	60	15	118
	6000- 7.5-0300	00051	6000- 7.5-0300 FV	010-00188	300					
	6000- 7.5-0540	00052	6000- 7.5-0540 FV	200-00113	540					
10.0	6000-10.0-0170	00058	6000-10.0-0170 FV	200-00119	170	28	46	70	15	118
	6000-10.0-0340	00061	6000-10.0-0340 FV	200-00121	340					
	6000-10.0-0680	00062	6000-10.0-0680 FV	200-00123	680					
15.0	6000-15.0-0300	00066	6000-15.0-0300 FV	200-00127	300	34	69	85	15	160
	6000-15.0-0400	00067	6000-15.0-0400 FV	200-00128	400					
	6000-15.0-0840	00068	6000-15.0-0840 FV	200-00129	840					
20.0	6000-20.0-0340	00074	6000-20.0-0340 FV	200-00134	340	38	69	98	15	160
	6000-20.0-0500	00075	6000-20.0-0500 FV	200-00135	500					
	6000-20.0-1000	00076	6000-20.0-1000 FV	200-00136	1000					
32.0	6000-32.0-0320	00080	6000-32.0-0320 FV	200-00140	320	50	88	135	23	214
	6000-32.0-0700	00082	6000-32.0-0700 FV	200-00142	700					
	6000-32.0-1200	00083	6000-32.0-1200 FV	200-00143	1200					
45.0	6000-45.0-0500	00197	-	-	500	50	88	135	23	214
	6000-45.0-1200	00159	-	-	1200					

• Other anchor lengths are available on request.

The reinforcement in the precast element will be suitable for lifting anchor provided, it is equal to or greater than the reinforcement shown on this chart. The reinforcement shown in this chart protects the cone around the anchor. Other reinforcement to ensure safe handling of the element as a whole must be designed by others.

If anchors in the edge of a wall/panel are to be used for demoulding, then a tilting table raised to $\geq 70^\circ$ must normally be used. Pitching from the horizontal is possible as follows:

Load range 1.3 t: cast the normal anchor in a pitching plate, code 6060, as shown on page 42.

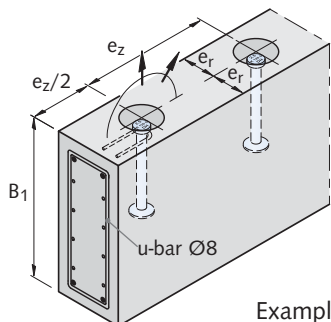
Load range 2.5 and 5.0 t: use the specially shaped anchor, code 6006 as shown on page 33.

If larger panels are to be pitched from the horizontal, then please ask Halfen for details of any reinforcement required. This will usually occur in harder concrete, so details are less critical.

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Anchor

Load capacity of anchors in beams and walls without special reinforcement (Load group 1.3 - 7.5 t)



Example beam

note: preferred $\beta = 30^\circ$
avoid $\beta = 45^\circ$ as far as possible

required reinforcement **1** mesh,
reinforcement **4** only with angled
pull (reinforcement see page 16)

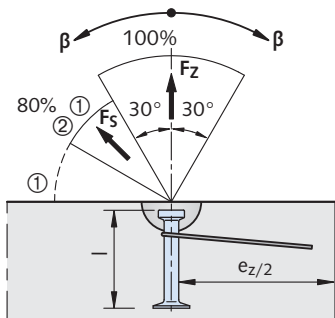
Load capacity of anchors in beams and walls with minimal reinforcement - **1** and **4** only

Load group	Designation mill finish	Length of anchor l [mm]	Minimum height of beams B ₁ [mm]	Wall thickness or beams width 2 × e _r [mm]	Load capacity (kN) at concrete strength of				Distance between anchors e _z [mm]
					Axial pull up to 30° [β]	Angled pull up to 45° [β]	Axial pull and angled pull up to 45° [β]	Axial pull and angled pull up to 45° [β]	
					15 N/mm ²	15 N/mm ²	25 N/mm ²	35 N/mm ²	
1.3	6000-1.3-0085	85	180	100	12,2	9,8	13,0	13,0	270
				120	13,0	11,2	13,0	13,0	
				140	13,0	12,5	13,0	13,0	
	6000-1.3-0120	120	250	80	13,0	10,7	13,0	13,0	375
				100	13,0	12,7	13,0	13,0	
				120	13,0	13,0	13,0	13,0	
	6000-1.3-0240	240	490	60	9,9	9,9	12,7	13,0	735
				80	13,0	13,0	13,0	13,0	
				100	13,0	13,0	13,0	13,0	
2.5	6000-2.5-0120	120	248	120	18,1	14,5	23,3	25,0	375
				140	20,3	16,2	25,0	25,0	
				160	22,4	17,9	25,0	25,0	
	6000-2.5-0170	170	348	100	20,7	16,5	25,0	25,0	525
				120	23,7	19,0	25,0	25,0	
				140	25,0	21,3	25,0	25,0	
	6000-2.5-0280	280	568	80	18,4	18,4	23,8	25,0	855
				100	23,0	23,0	25,0	25,0	
				120	25,0	25,0	25,0	25,0	
4.0	6000-4.0-0170	170	347	160	29,8	23,8	38,5	40,0	535
				180	32,5	26,0	40,0	40,0	
				200	35,2	28,2	40,0	40,0	
	6000-4.0-0240	240	487	120	31,3	25,1	40,0	40,0	745
				140	35,2	28,1	40,0	40,0	
				160	38,9	31,1	40,0	40,0	
	6000-4.0-0340	340	687	100	29,6	28,7	38,2	40,0	1045
				120	35,6	32,9	40,0	40,0	
				140	40,0	36,9	40,0	40,0	
5.0	6000-5.0-0240	240	490	200	45,7	36,5	50,0	50,0	735
				220	49,1	39,2	50,0	50,0	
				240	50,0	41,9	50,0	50,0	
	6000-5.0-0340	340	690	160	50,0	40,6	50,0	50,0	1035
				180	50,0	44,4	50,0	50,0	
				200	50,0	48,0	50,0	50,0	
	6000-5.0-0480	480	970	140	46,1	46,1	50,0	50,0	1455
				160	50,0	50,0	50,0	50,0	
				180	50,0	50,0	50,0	50,0	
7.5	6000-7.5-0200	200	410	240	45,1	36,0	58,2	68,8	610
				260	47,8	38,3	61,8	73,1	
				280	50,6	40,5	65,3	75,0	
	6000-7.5-0300	300	610	200	54,1	43,3	69,9	75,0	910
				220	58,1	46,5	75,0	75,0	
				240	62,2	49,7	75,0	75,0	
	6000-7.5-0540	540	1090	160	63,2	58,4	75,0	75,0	1630
				180	71,1	63,8	75,0	75,0	
				200	75,0	69,1	75,0	75,0	

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Anchor

Load capacity of anchors in beams and walls without special reinforcement (Load group 10.0 - 45.0 t)



- ① Angled pull at $\beta > 30^\circ$ without reinforcement for angled pull is only allowed at :
- Concrete strength 15 N/mm² and wall thickness 3 times minimum thickness $2 \times e_r$
 - Concrete strength 25N/mm² and wall thickness 2.5 times minimum thickness $2 \times e_r$

- Concrete strength 35N/mm² and wall thickness 2 times minimum thickness $2 \times e_r$
- ② At a concrete strength $> 23\text{N/mm}^2$ $F_z = F_s$.
- ③ Angled pull with $\beta > 60^\circ$ caused by spread of cables/chains is not permitted!

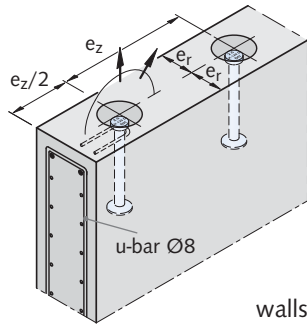
Load capacity of anchors in beams and walls with minimal reinforcement - 1 and 4 only

Load group	Designation mill finish	Length of anchor l [mm]	Minimum height of beams B ₁ [mm]	Wall thickness or beams width $2 \times e_r$ [mm]	Load capacity (kN) at concrete strength of				Distance between anchors e _z [mm]
					Axial pull up to 30° [β]		Axial pull and angled pull up to 45° [β]		
					15 N/mm ²	15 N/mm ²	25 N/mm ²	35 N/mm ²	
10.0	6000-10.0-0170	170	340	300	46,4	37,2	60,0	70,9	520
				350	52,1	41,7	67,3	79,6	
				400	57,6	46,1	74,4	88,0	
	6000-10.0-0340	340	680	280	76,6	61,3	98,9	100,0	1030
				300	80,7	64,5	100,0	100,0	
				320	84,7	67,7	100,0	100,0	
	6000-10.0-0680	680	1360	160	73,7	70,0	95,2	100,0	2050
				180	83,0	76,5	100,0	100,0	
				200	92,2	82,8	100,0	100,0	
15.0	6000-15.0-0300	300	600	350	81,3	65,0	104,9	124,2	900
				400	89,5	71,9	116,0	137,2	
				500	106,2	85,0	137,1	150,0	
	6000-15.0-0400	400	800	350	102,5	82,0	132,3	150,0	1200
				400	113,2	90,6	146,2	150,0	
				450	123,7	99,0	150,0	150,0	
	6000-15.0-0840	840	1680	300	150,0	132,5	150,0	150,0	2520
				340	150,0	145,5	150,0	150,0	
				380	150,0	150,0	150,0	150,0	
20.0	6000-20.0-0340	340	670	500	116,6	93,3	150,6	178,2	1010
				750	158,1	126,5	200,0	200,0	
				1000	196,2	156,9	200,0	200,0	
	6000-20.0-0500	500	990	400	134,8	107,9	174,1	200,0	1490
				500	159,4	127,5	200,0	200,0	
				600	182,8	146,2	200,0	200,0	
	6000-20.0-1000	1000	1990	240	154,9	128,6	199,9	200,0	3000
				300	190,0	152,0	200,0	200,0	
				330	200,0	163,2	200,0	200,0	
32.0	6000-32.0-0320	320	630	600	126,7	101,3	163,5	193,5	940
				800	157,2	125,7	202,9	240,1	
				1200	177,2	141,8	228,8	270,7	
	6000-32.0-0700	700	1390	500	208,6	166,9	269,4	318,7	2080
				600	239,2	191,4	308,8	320,0	
				750	282,8	226,2	320,0	320,0	
	6000-32.0-1200	1200	2390	400	272,5	218,0	320,0	320,0	3580
				450	297,7	238,2	320,0	320,0	
				500	320,0	257,8	320,0	320,0	
45.0	6000-45.0-0500	500	990	800	226,0	180,8	291,8	345,3	1480
				1000	267,2	213,8	345,0	408,2	
				1500	358,4	286,7	450,0	450,0	
	6000-45.0-1200	1200	2400	500	322,2	257,8	416,0	450,0	3580
				600	369,4	295,5	450,0	450,0	
				750	436,7	349,4	450,0	450,0	

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Anchor

Load capacity of anchors in walls with fully activated reinforcement (Load group 1.3 - 7.5 t)



walls only

Required reinforcement **1**, **2**, **3**,
reinforcement **4** only with angled
pull (reinforcement see page 16)

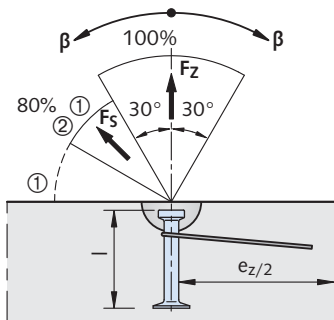
Load capacity of anchors in walls with fully activated reinforcement

Load group	Designation mill finish	Length of anchor l [mm]	Wall width $2 \times e_r$ [mm]	Load capacity (kN) at concrete strength of				Distance between anchors e_z [mm]
				Axial pull up to 30° [β] 15 N/mm ²	Angled pull up to 45° [β] 15 N/mm ²	Axial pull and angled pull up to 45° [β] 25 N/mm ²	Axial pull and angled pull up to 45° [β] 35 N/mm ²	
1.3	6000-1.3-0120	120	60	9,9	9,9	12,8	13,0	375
			80	13,0	13,0	13,0	13,0	
			100	13,0	13,0	13,0	13,0	
	6000-1.3-0240	240	60	9,9	9,9	12,8	13,0	735
			80	13,0	13,0	13,0	13,0	
			100	13,0	13,0	13,0	13,0	
2.5	6000-2.5-0170	170	80	18,4	18,4	23,8	25,0	525
			100	23,0	23,0	25,0	25,0	
			120	25,0	25,0	25,0	25,0	
	6000-2.5-0280	280	80	18,4	18,4	23,8	25,0	855
			100	23,0	23,0	25,0	25,0	
			120	25,0	25,0	25,0	25,0	
4.0	6000-4.0-0240	240	120	35,6	35,6	40,0	40,0	745
			140	40,0	36,0	40,0	40,0	
			160	40,0	38,5	40,0	40,0	
	6000-4.0-0340	340	100	29,6	29,6	38,2	40,0	1045
			120	35,6	35,6	40,0	40,0	
			140	40,0	40,0	40,0	40,0	
5.0	6000-5.0-0240	240	160	50,0	45,2	50,0	50,0	735
			180	50,0	48,0	50,0	50,0	
			200	50,0	50,0	50,0	50,0	
	6000-5.0-0340	340	120	39,5	39,5	50,0	50,0	1035
			140	46,1	46,1	50,0	50,0	
			160	50,0	50,0	50,0	50,0	
6000-5.0-0480	480	100	32,9	32,9	42,5	50,0	1455	
		120	39,5	39,5	50,0	50,0		
		140	46,1	46,1	50,0	50,0		
7.5	6000-7.5-0300	300	160	63,2	56,6	75,0	75,0	910
			180	71,1	60,0	75,0	75,0	
			200	75,0	63,2	75,0	75,0	
	6000-7.5-0540	540	140	55,3	55,3	71,4	75,0	1630
			160	63,2	63,2	75,0	75,0	
			180	71,1	71,1	75,0	75,0	

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Anchor

Load capacity of anchors in walls with fully activated reinforcement (Load group 10.0 - 45.0 t)



- ① Angled pull at $\beta > 30^\circ$ without reinforcement for angled pull is only allowed at:
- Concrete strength 15 N/mm² and wall thickness 3 times minimum thickness $2 \times e_r$
 - Concrete strength 25N/mm² and wall thickness 2.5 times minimum thickness $2 \times e_r$

- Concrete strength 35N/mm² and wall thickness 2 times minimum thickness $2 \times e_r$
- ② At a concrete strength $> 23\text{N/mm}^2$ $F_z = F_s$.
- ③ Angled pull with $\beta > 60^\circ$ caused by spread of cables/chains is not permitted!

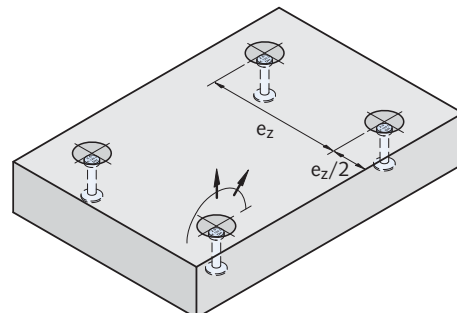
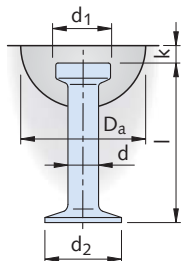
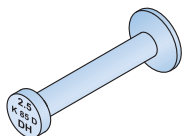
Load capacity of anchors in walls with fully activated reinforcement

Load group	Designation mill finish	Length of anchor l [mm]	Wall thickness $2 \times e_r$ [mm]	Load capacity (kN) at concrete strength of				Distance between anchors e_z [mm]
				Axial pull up to 30° [β]	Angled pull up to 45° [β]	Axial pull and angled pull up to 45° [β]	Axial pull and angled pull up to 45° [β]	
				15 N/mm ²	15 N/mm ²	25 N/mm ²	35 N/mm ²	
10.0	6000-10.0-0340	340	200	89,5	71,6	100,0	100,0	1030
			240	98,0	78,4	100,0	100,0	
			280	100,0	84,7	100,0	100,0	
	6000-10.0-0680	680	160	73,7	73,7	95,2	100,0	2050
			180	83,0	83,0	100,0	100,0	
15.0	6000-15.0-0400	400	300	128,9	103,1	150,0	150,0	1200
			400	148,9	119,1	150,0	150,0	
			500	150,0	133,1	150,0	150,0	
	6000-15.0-0840	840	200	111,9	111,9	144,5	150,0	2520
			220	123,1	123,1	150,0	150,0	
			240	134,2	134,2	150,0	150,0	
20.0	6000-20.0-0500	500	300	162,1	129,7	200,0	200,0	1490
			400	175,1	140,1	200,0	200,0	
			500	187,2	149,7	200,0	200,0	
			600	200,0	183,4	200,0	200,0	
	6000-20.0-1000	1000	240	154,9	154,9	199,9	200,0	3000
			260	167,8	167,8	200,0	200,0	
			280	180,7	180,7	200,0	200,0	
32.0	6000-32.0-0700	700	450	282,6	226,1	320,0	320,0	2080
			550	312,5	250,0	320,0	320,0	
			650	320,0	271,8	320,0	320,0	
	6000-32.0-1200	1200	300	266,7	266,7	320,0	320,0	3580
			350	311,1	311,1	320,0	320,0	
45.0	6000-45.0-1200	1200	400	355,5	355,5	450,0	450,0	3580
			500	444,4	421,6	450,0	450,0	
			600	450,0	450,0	450,0	450,0	

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Anchor

Dimensions of Spherical Head Anchors in slabs



Dimensions of Spherical Head Anchors in slabs										
Load group	Designation mill finish	Order no. 0735.010-	Designation <i>hot-dip galvanised</i>	Order no. 0735.-	l [mm]	d [mm]	d ₁ [mm]	d ₂ [mm]	k [mm]	D _a [mm]
1.3	6000- 1.3-0040	00002	6000- 1.3-0040 FV	200-00067	40	10	19	25	10	60
	6000- 1.3-0050	00003	6000- 1.3-0050 FV	200-00068	50					
	6000- 1.3-0065	00005	6000- 1.3-0065 FV	200-00070	65					
	6000- 1.3-0085	00006	6000- 1.3-0085 FV	200-00071	85					
	6000- 1.3-0120	00007	6000- 1.3-0120 FV	200-00072	120					
2.5	6000- 2.5-0055	00016	6000- 2.5-0055 FV	200-00081	55	14	26	35	11	74
	6000- 2.5-0065	00017	6000- 2.5-0065 FV	200-00082	65					
	6000- 2.5-0085	00018	6000- 2.5-0085 FV	200-00083	85					
	6000- 2.5-0120	00019	6000- 2.5-0120 FV	200-00084	120					
	6000- 2.5-0170	00020	6000- 2.5-0170 FV	200-00085	170					
4.0	6000- 4.0-0075	00023	6000- 4.0-0075 FV	200-00088	75	18	36	45	15	94
	6000- 4.0-0100	00024	6000- 4.0-0100 FV	200-00089	100					
	6000- 4.0-0170	00027	6000- 4.0-0170 FV	200-00091	170					
	6000- 4.0-0210	00028	6000- 4.0-0210 FV	200-00092	210					
5.0	6000- 5.0-0085	00035	6000- 5.0-0085 FV	200-00098	85	20	36	50	15	94
	6000- 5.0-0095	00036	6000- 5.0-0095 FV	010-00172	95					
	6000- 5.0-0120	00038	6000- 5.0-0120 FV	200-00100	120					
	6000- 5.0-0180	00039	6000- 5.0-0180 FV	200-00101	180					
	6000- 5.0-0240	00040	6000- 5.0-0240 FV	010-00174	240					
7.5	6000- 7.5-0100	00043	6000- 7.5-0100 FV	200-00106	100	24	46	60	15	118
	6000- 7.5-0120	00046	6000- 7.5-0120 FV	200-00107	120					
	6000- 7.5-0140	00047	6000- 7.5-0140 FV	200-00108	140					
	6000- 7.5-0165	00049	6000- 7.5-0165 FV	200-00110	165					
	6000- 7.5-0200	00050	6000- 7.5-0200 FV	200-00111	200					
	6000- 7.5-0300	00051	6000- 7.5-0300 FV	010-00188	300					
10.0	6000-10.0-0115	00054	6000-10.0-0115 FV	200-00116	115	28	46	70	15	118
	6000-10.0-0135	00056	6000-10.0-0135 FV	200-00117	135					
	6000-10.0-0150	00057	6000-10.0-0150 FV	200-00118	150					
	6000-10.0-0170	00058	6000-10.0-0170 FV	200-00119	170					
	-	-	6000-10.0-0220 FV	200-00149	220					
	-	-	6000-10.0-0250 FV	200-00120	250					
15.0	6000-10.0-0340	00061	6000-10.0-0340 FV	200-00121	340	34	69	85	15	160
	6000-15.0-0140	00063	6000-15.0-0140 FV	200-00124	140					
	6000-15.0-0165	00064	6000-15.0-0165 FV	200-00125	165					
	6000-15.0-0200	00065	6000-15.0-0200 FV	200-00126	200					
	6000-15.0-0300	00066	6000-15.0-0300 FV	200-00127	300					
	6000-15.0-0400	00067	6000-15.0-0400 FV	200-00128	400					
20.0	6000-20.0-0200	00070	6000-20.0-0200 FV	200-00131	200	38	69	98	15	160
	6000-20.0-0240	00071	6000-20.0-0240 FV	200-00132	240					
	-	-	6000-20.0-0250 FV	200-00133	250					
	6000-20.0-0340	00074	6000-20.0-0340 FV	200-00134	340					
32.0	6000-20.0-0500	00075	6000-20.0-0500 FV	200-00135	500	50	88	135	23	214
	6000-32.0-0200	00077	6000-32.0-0200 FV	200-00137	200					
	6000-32.0-0250	00078	6000-32.0-0250 FV	200-00138	250					
	6000-32.0-0280	00079	6000-32.0-0280 FV	200-00139	280					
	6000-32.0-0320	00080	6000-32.0-0320 FV	200-00140	320					

• Other lengths and stainless steel anchors on request.

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Anchor

Load capacity of Spherical Head Anchors in slabs with any direction of pull

Load group	Designation mill finish	Length of anchor l [mm]	Load capacity (kN) at minimal slab thickness			Load capacity (kN) at normal slab thickness			Distance between anchors e_z [mm]		
			Slab thickness B_2 [mm]	Concrete strength		Slab thickness B_3 [mm]	Concrete strength				
				*15 N/mm ²	25 N/mm ²		35 N/mm ²	*15 N/mm ²		25 N/mm ²	35 N/mm ²
1.3	6000- 1.3-0040	40	75	7,8	10,0	11,9	90	8,8	11,3	13,0	135
	6000- 1.3-0050	50	85	10,1	13,0	13,0	110	12,0	13,0	13,0	165
	6000- 1.3-0065	65	100	13,0	13,0	13,0	140	13,0	13,0	13,0	210
	6000- 1.3-0085	85	120	13,0	13,0	13,0	180	13,0	13,0	13,0	270
2.5	6000- 1.3-0120	120	155	13,0	13,0	13,0	250	13,0	13,0	13,0	375
	6000- 2.5-0055	55	90	11,2	14,5	17,1	120	13,3	17,2	20,4	180
	6000- 2.5-0065	65	100	13,8	17,8	21,1	140	17,0	22,0	25,0	210
	6000- 2.5-0085	85	120	19,5	25,0	25,0	180	25,0	25,0	25,0	265
	6000- 2.5-0120	120	155	25,0	25,0	25,0	250	25,0	25,0	25,0	375
4.0	6000- 2.5-0170	170	205	25,0	25,0	25,0	350	25,0	25,0	25,0	520
	6000- 4.0-0075	75	115	17,5	22,6	26,8	165	22,2	28,7	33,9	240
	6000- 4.0-0100	100	140	25,3	32,7	38,6	215	33,6	40,0	40,0	320
	6000- 4.0-0170	170	210	40,0	40,0	40,0	355	40,0	40,0	40,0	540
5.0	6000- 4.0-0210	210	250	40,0	40,0	40,0	435	40,0	40,0	40,0	650
	6000- 5.0-0085	85	125	20,1	26,0	30,8	180	25,7	33,1	39,2	270
	6000- 5.0-0095	95	135	23,3	30,0	35,5	200	30,2	39,0	46,2	300
	6000- 5.0-0120	120	160	31,7	41,0	48,5	250	42,7	50,0	50,0	375
	6000- 5.0-0180	180	220	50,0	50,0	50,0	370	50,0	50,0	50,0	555
7.5	6000- 5.0-0240	240	280	50,0	50,0	50,0	490	50,0	50,0	50,0	735
	6000- 7.5-0100	100	140	24,5	31,6	37,4	205	31,6	40,9	48,3	309
	6000- 7.5-0120	120	160	31,3	40,4	47,8	245	41,7	53,8	63,6	370
	6000- 7.5-0140	140	180	38,6	49,9	59,0	285	52,6	67,9	75,0	430
	6000- 7.5-0165	165	205	48,6	62,7	74,2	335	67,6	75,0	75,0	505
	6000- 7.5-0200	200	240	63,8	75,0	75,0	405	75,0	75,0	75,0	610
10.0	6000- 7.5-0300	300	340	75,0	75,0	75,0	605	75,0	75,0	75,0	910
	6000-10.0-0115	115	155	29,1	37,5	44,4	230	38,0	49,1	58,1	350
	6000-10.0-0135	135	175	36,3	46,8	55,4	270	48,7	62,9	74,4	410
	6000-10.0-0150	150	190	42,0	54,3	64,2	300	57,3	73,9	87,5	455
	6000-10.0-0170	170	210	50,2	64,8	76,6	340	69,4	89,6	100,0	515
	6000-10.0-0200	200	240	63,2	81,7	96,6	400	89,2	100,0	100,0	605
15.0	6000-10.0-0250	250	290	87,3	100,0	100,0	500	100,0	100,0	100,0	755
	6000-10.0-0340	340	380	100,0	100,0	100,0	680	100,0	100,0	100,0	1025
	6000-15.0-0140	140	180	37,5	48,4	57,2	275	49,8	64,3	76,1	415
	6000-15.0-0165	165	205	47,3	61,1	72,3	325	64,5	83,2	98,5	490
	6000-15.0-0200	200	240	62,4	80,6	95,3	395	87,2	112,5	133,1	595
20.0	6000-15.0-0300	300	340	113,0	145,8	150,0	595	150,0	150,0	150,0	895
	6000-15.0-0400	400	440	150,0	150,0	150,0	795	150,0	150,0	150,0	1195
	6000-20.0-0200	200	240	61,6	79,5	94,1	390	85,1	109,9	130,0	585
	6000-20.0-0240	240	280	80,5	103,9	122,9	470	113,7	146,7	173,6	705
	6000-20.0-0250	250	290	85,5	110,3	130,5	490	121,2	156,5	185,2	735
32.0	6000-20.0-0300	300	340	112,0	144,5	171,0	590	161,7	200,0	200,0	885
	6000-20.0-0340	340	380	134,9	174,2	200,0	670	196,9	200,0	200,0	1005
	6000-20.0-0500	500	540	200,0	200,0	200,0	990	200,0	200,0	200,0	1485
	6000-32.0-0200	200	248	62,4	80,5	95,3	385	83,8	108,1	127,9	580
32.0	6000-32.0-0250	250	298	86,4	111,5	132,0	485	119,7	154,5	182,9	730
	6000-32.0-0280	280	328	102,1	131,8	155,9	545	143,4	185,1	219,0	820
32.0	6000-32.0-0320	320	368	124,4	160,6	190,0	625	177,2	228,8	270,7	940

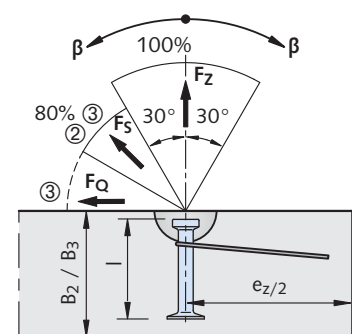
- Handling reinforcement for the slab as a whole must be designed by others
 - B2 Concrete cover at the foot of the anchor 25mm
 - B3 Concrete thickness, twice the effective embedment of the anchor
 - Thinner slabs are possible provided the foot of the anchor has suitable corrosion protection – consult Halfen
 - Between B2 and B3 the load capacity can be found by linear interpolation.
 - * at concrete strength 15N/mm² the load capacity for angled pull with $\beta > 30^\circ$ is only 80%.
- Further informations see ① and ②.

- The minimum reinforcement mesh is
131mm² squared up to 4.0t
188mm² squared up to 7.5t
257mm² squared up to 15.0t
377mm² squared for 20.0t
513mm² squared for 32.0t

- ① Angled pull at $\beta > 30^\circ$ without reinforcement for angled pull is only allowed at:
- Concrete strength 15 N/mm² and wall thickness 3 times minimum thickness $2 \times e_r$
 - Concrete strength 25 N/mm² and wall thickness 2.5 times minimum thickness $2 \times e_r$
 - Concrete strength 35 N/mm² and wall thickness 2 times minimum thickness $2 \times e_r$

- ② At a concrete strength $> 23\text{N/mm}^2$ $F_z = F_s$.
- ③ Angled pull with $\beta > 60^\circ$ caused by spread of cables/chains is not permitted!

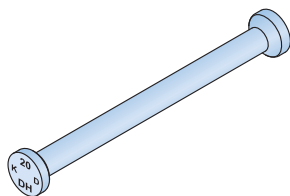
Required reinforcement ④ only with angled pull (reinforcement see page 16)



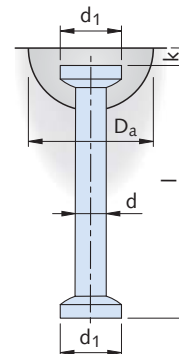
DEHA LIFTING ANCHOR SYSTEM

Narrow Foot Spherical Head Anchor

Dimensions, load capacity and reinforcement of Narrow foot anchors



This anchor is used in prestressed beams, because of good concrete strength at lifting and in most cases a thin web, the small foot is easier to use.

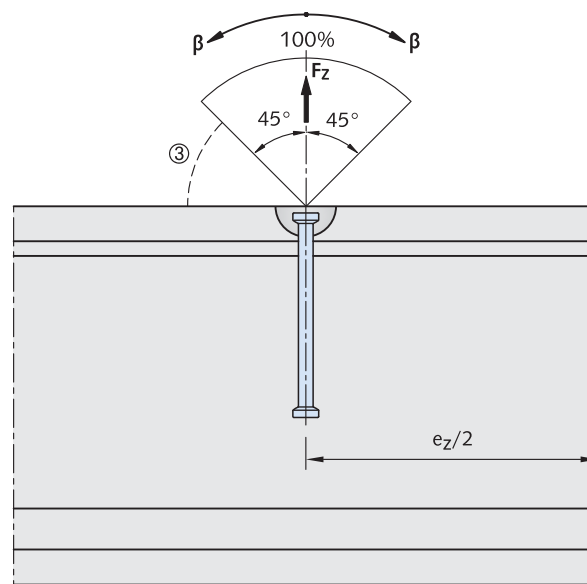
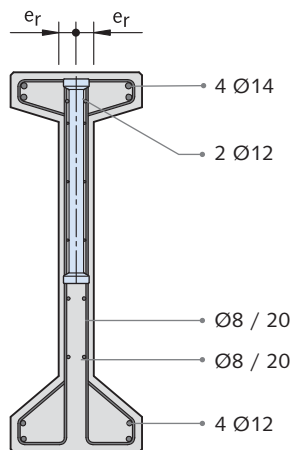
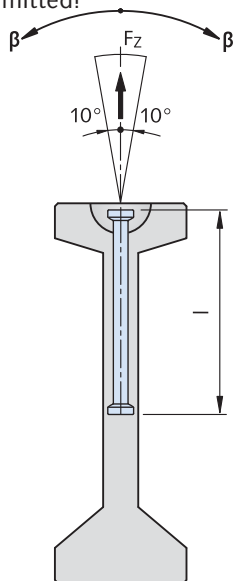


Dimensions of Narrow foot Spherical Head Anchors									
Load group	Designation mill finish	Order no. 0735.018-	Designation <i>hot-dip galvanised</i>	Order no. 0735.208-	l [mm]	d [mm]	d ₁ [mm]	k [mm]	D _a [mm]
10.0	60000-10.0-0340D WB	00056	60000-10.0-0340D FV	00056	340	28	46	15	118
15.0	60000-15.0-0400D WB	00057	60000-15.0-0400D FV	00057	400	34	69	15	160
20.0	60000-20.0-0500D WB	00067	60000-20.0-0500D FV	00067	500	38	69	15	160
32.0	60000-32.0-0700D WB	00058	60000-32.0-0700D FV	00058	700	50	88	23	214

Minimum reinforcement is shown on the drawing below.

Load capacity for axial pull and angled pull up to $\beta = 45^\circ$					
Load group	Designation mill finish	web thick- ness $2 \times e_r$ [mm]	Distance between anchors e_z [mm]	Axial pull and angled pull up to 45° [β]	
				Load capacity (kN)	
				Concrete strength	
				45 N/mm ²	55 N/mm ²
10.0	6000-10.0-0340D	120	≥ 1360	88,0	98,0
15.0	6000-15.0-0400D	120	≥ 1600	130,0	145,0
20.0	6000-20.0-0500D	120	≥ 2000	136,0	151,0
		140	≥ 2000	173,0	192,0
32.0	6000-32.0-0700D	120	≥ 2800	189,0	210,0
		140	≥ 2800	220,0	245,0

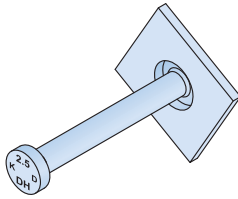
Angled pull with $\beta > 60^\circ$ caused by spread of cables/chains is not permitted!



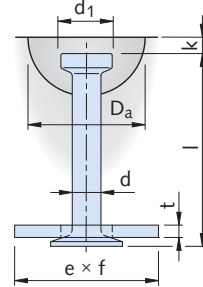
DEHA LIFTING ANCHOR SYSTEM

Spherical Head Plate Anchor

Dimensions, load capacity and reinforcement of Spherical Head plate anchor



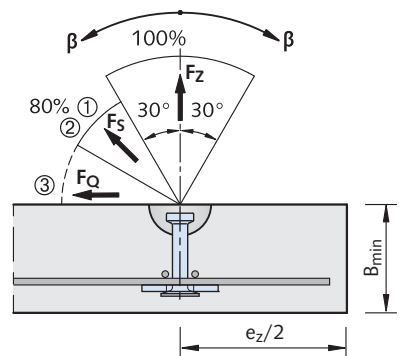
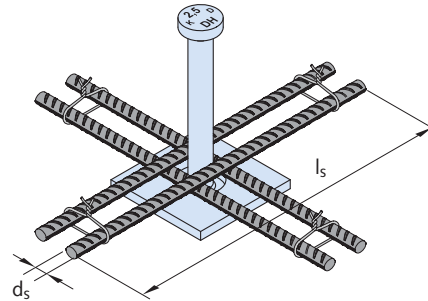
This anchor is designed for thin slabs and shells where the normal short spherical head anchor does not provide enough anchorage.



The minimum thickness of the concrete element is shown in the table. If you want to lift thinner panels, you have to apply corrosion protection to the base of the anchor. Plate must be placed below the mesh or special reinforcement added as shown in the drawing. Additional reinforcement is not supplied by Halfen and should be prepared by the supplier of the main reinforcement of the precast element.

Dimensions of Spherical Plate Anchors									
Load group	Designation mill finish	Order no. 0735.060-	l [mm]	d [mm]	d ₁ [mm]	e x f [mm]	t [mm]	k [mm]	D _a [mm]
2.5	6010- 2.5-0055	00001	55	14	26	70x70	6	10	74
	6010- 2.5-0120	00002	120	14	26	70x70	6	10	74
5.0	6010- 5.0-0065	00004	65	20	36	90x90	8	15	94
	6010- 5.0-0110	00007	110	20	36	90x90	8	15	94
10.0	6010-10.0-0115	00009	115	28	46	90x90	10	15	118
	6010-10.0-0150	00011	150	28	46	90x90	10	15	118

Handling reinforcement for the slab as a whole must be designed by others



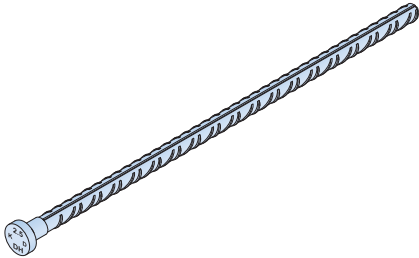
- ① Angled pull at $\beta > 30^\circ$ without reinforcement for angled pull is only allowed at:
 - Concrete strength 15 N/mm² and wall thickness 3 times minimum thickness $2 \times e_r$
 - Concrete strength 25 N/mm² and wall thickness 2.5 times minimum thickness $2 \times e_r$
 - Concrete strength 35 N/mm² and wall thickness 2 times minimum thickness $2 \times e_r$
- ② At a concrete strength $> 23\text{N/mm}^2$ $F_z = F_s$.
- ③ Angled pull with $\beta > 60^\circ$ caused by spread of cables/chains is not permitted!

Reinforcement and load capacity for axial pull and angled pull up to $\beta = 45^\circ$									
Load group	Designation mill finish	Element thickness	Distance between anchors	Reinforcement		Load capacity (kN)			
		B _{min}	e _z	d _s	l _s	Concrete strength			
		[mm]	[mm]	[mm]	[mm]	15 N/mm ²	25 N/mm ²	35 N/mm ²	45 N/mm ²
2.5	6010- 2.5-0055	85	560	8	200	10,8	13,9	16,5	18,7
	6010- 2.5-0120	150	1000	10	300	25,0	25,0	25,0	25,0
5.0	6010- 5.0-0065	100	1000	12	450	16,1	20,8	24,6	27,9
	6010- 5.0-0110	145	1000	12	450	33,9	43,7	50,0	50,0
10.0	6010-10.0-0115	150	1280	16	600	34,6	44,7	52,8	59,9
	6010-10.0-0150	185	1280	16	600	55,9	72,1	85,3	96,7

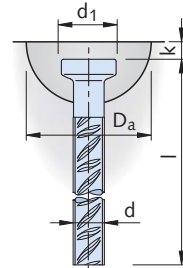
DEHA LIFTING ANCHOR SYSTEM

Spherical Head Rod Anchor

Dimensions of Spherical Head Rod Anchors



The spherical head ribbed bar anchor is designed for lifting thin components such as walls, garages or prestressed beams or lightweight concrete. As the load is transferred down the whole length of the anchor and there is no load concentration at the foot, this anchor is suitable for thinner walls. The anchor may also be cast into pockets in factory made brick panels..



Dimensions of Spherical Head Rod-Anchors

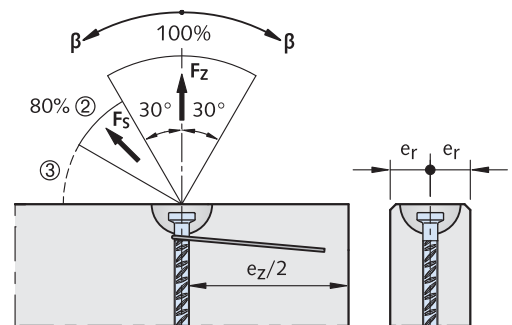
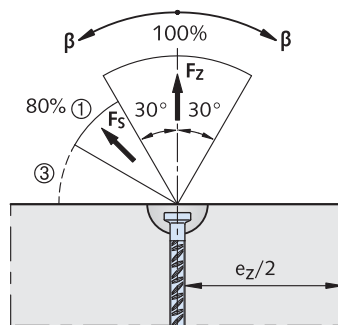
Load group	Designation mill finish	Order no. 0735.070-	Designation hot-dip galvanised	Order no. 0735.070-	l [mm]	d [mm]	d ₁ [mm]	k [mm]	D _a [mm]
2.5	6050- 2.5-0400 WB	00002	6050- 2.5-0400 FV	00158	400	14	26	11	74
	6050- 2.5-0520 WB	00003	-	-	520	14	26	11	74
4.0	6050- 4.0-0510 WB	00004	-	-	510	18	36	15	94
	6050- 4.0-0720 WB	00005	-	-	720	18	36	15	94
	6050- 4.0-1150 WB	00006	-	-	1150	18	36	15	94
5.0	6050- 5.0-0580 WB	00007	6050- 5.0-0580 FV	00159	580	20	36	15	94
	6050- 5.0-0900 WB	00008	-	-	900	20	36	15	94
7.5	6050- 7.5-0750 WB	00009	-	-	750	24	46	15	118
	6050- 7.5-1150 WB	00010	-	-	1150	24	46	15	118
10.0	6050-10.0-0870 WB	00011	-	-	870	28	46	15	118
	6050-10.0-1300 WB	00012	-	-	1300	28	46	15	118
15.0	6050-15.0-1080 WB	00013	-	-	1080	34	69	15	160
	6050-15.0-1550 WB	00014	-	-	1550	34	69	15	160

① Other lengths on request.

Without reinforcement for angled pull

With reinforcement for angled pull

- ① Angled pull at $\beta > 30^\circ$ without reinforcement for angled pull is only allowed at:
 - Concrete strength 15 N/mm² and wall thickness 3 times minimum thickness $2 \times e_r$
 - Concrete strength 25 N/mm² and wall thickness 2.5 times minimum thickness $2 \times e_r$
 - Concrete strength 35 N/mm² and wall thickness 2 times minimum thickness $2 \times e_r$
- ② At a concrete strength $> 23\text{N/mm}^2$ $F_z = F_s$.
- ③ Angled pull with $\beta > 60^\circ$ caused by spread of cables/chains is not permitted!

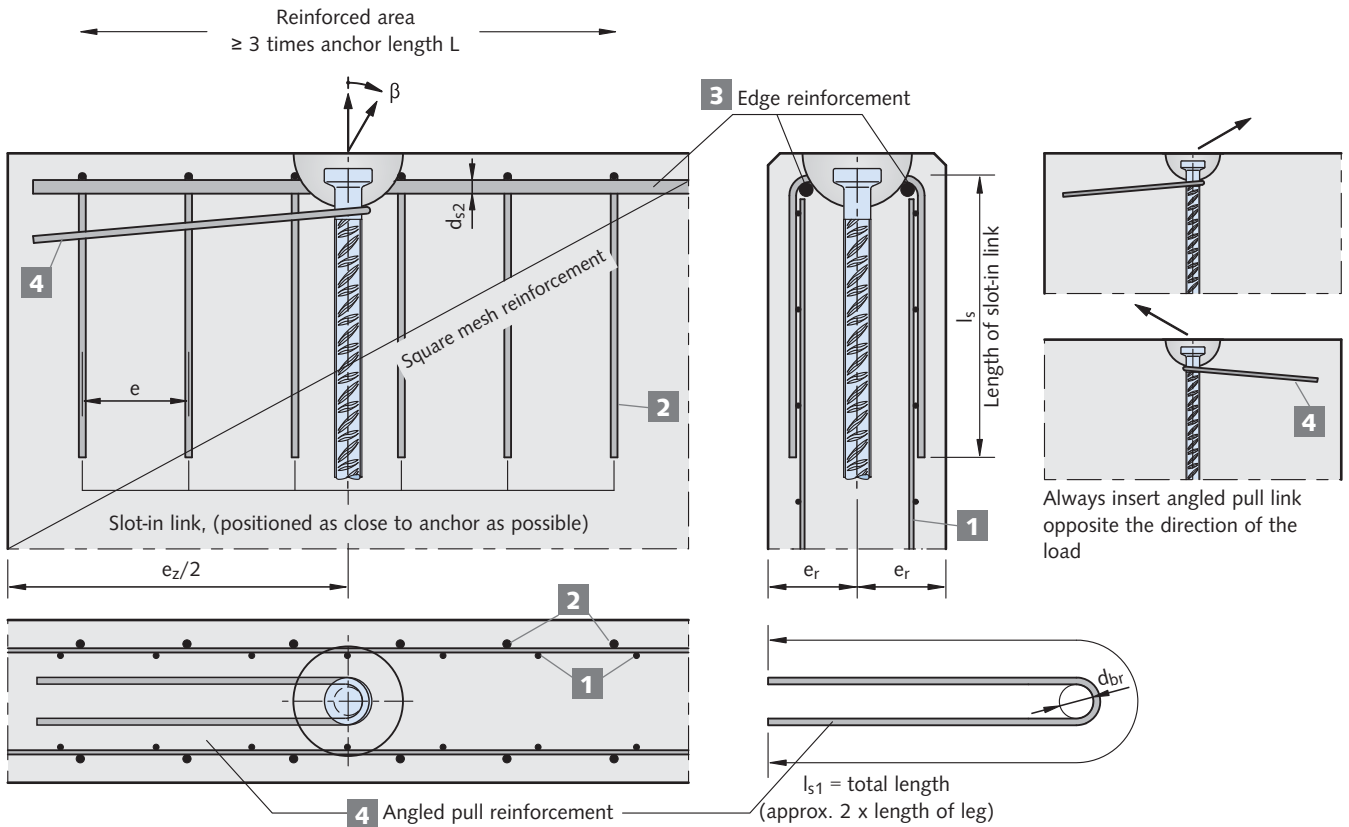


⚠ The angled pull reinforcement has to be placed as close as possible under the recess and has to be installed with full contact to the anchor.

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Rod Anchor

Load capacity and reinforcement of Spherical Head Rod-Anchors



Reinforcement and load capacity for axial pull and angled pull up to $\beta = 45^\circ$

Load group	Designation mill finish	Element thickness $2 \times e_r$ [mm]	Distance between anchors e_z [mm]	1		2		Axial pull up to $\beta = 30^\circ$			Angled pull up to $\beta = 45^\circ$			Load capacity (kN) concrete strength	
				Square mesh reinforcement mm ² /m	Slot-in links $\varnothing s \times l_s$ [mm]	① a_1 [mm]	3 Edge reinforcement d_{s2} [mm]	Load capacity (kN) concrete strength		4 Angled pull link			Load capacity (kN) concrete strength		
								15 N/mm ²	25 N/mm ²	d_{s1} [mm]	l_{s1} [mm]	d_{br} [mm]	15 N/mm ²	25 N/mm ²	
2.5	6050- 2.5-0400	80	820	2×188	8×540	90	-	25.0	25.0	10	600	24	20.0	25.0	
		100						25.0	25.0				20.0	25.0	
	6050- 2.5-0520	100	1050		8×600			25.0	25.0				20.0	25.0	
4.0	6050- 4.0-0510	80	1000	2×188	8×580	90	$2 \varnothing 12$	32,8	40,0	12	1000	29	26,3	40,0	
		100						35,5	40,0				28,4	40,0	
		120						38,2	40,0				30,6	40,0	
		140						40,0	40,0				32,0	40,0	
	6050- 4.0-0720	100	1450		8×650			40,0	40,0				32,0	40,0	
5.0	6050- 5.0-0580	100	1150	2×188	10×680	120	$2 \varnothing 12$	40,9	50,0	12	1000	34	32,7	50,0	
		120						44,2	50,0				35,4	50,0	
		140						47,1	50,0				37,7	50,0	
		160						50,0	50,0				40,0	50,0	
	6050 -5.0-0900	120	1800		10×780			50,0	50,0				40,0	50,0	
7.5	6050- 7.5-0750	120	1500	2×188	10×740	140	$2 \varnothing 14$	66,1	75,0	20	1000	41	52,9	75,0	
		140						70,1	75,0				56,1	75,0	
		160						75,0	75,0				60,0	75,0	
	6050- 7.5-1150	140	2300		10×880			75,0	75,0				60,0	75,0	
10.0	6050-10.0-0870	140	1750	2×188	10×800	160	$2 \varnothing 14$	100,0	100,0	20	1100	49	80,0	100,0	
		160						100,0	100,0				80,0	100,0	
15.0	6050-15.0-1080	160	2200	2×188	12×1020	200	$2 \varnothing 14$	150,0	150,0	25	1100	70	120,0	150,0	
		200						150,0	150,0				120,0	150,0	

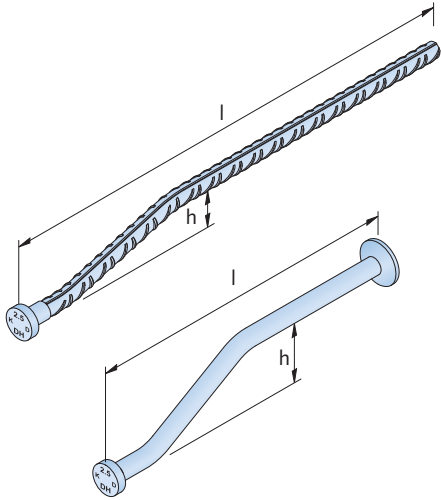
$\beta = 30^\circ$ is preferred

① if the element thickness is $< 2 \times e_r$ then the slot-in links are needed

DEHA LIFTING ANCHOR SYSTEM

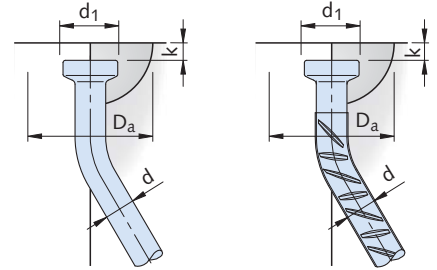
Spherical Head Sandwich Panel Anchor and Spherical Head Rod Anchor, offset versions

Dimensions of sandwich Panel Anchor and Spherical Head Rod Anchor, offset versions

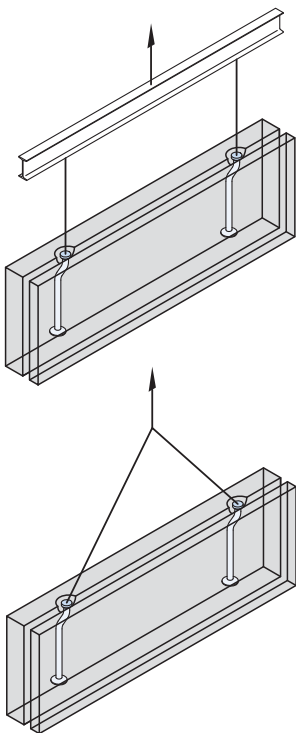


This anchor is designed to be cast into the inner skin of sandwich panels. This ensures that the hook is at the centre of gravity of the finish unit.

It is available in two forms, as a headed anchor and as a ribbed bar anchor.



The head at the centre of gravity means that the unit is hanging straight at the crane. The foot or ribbed bar transfers the load to the middle of the bearing concrete.



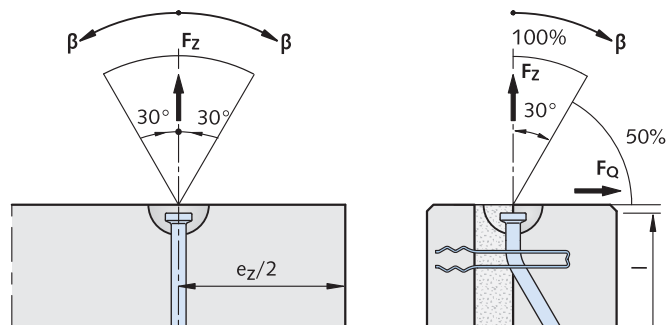
We recommend that these panels are lifted with a spreader beam. Lifting with chains at $\beta \leq 30^\circ$ may be possible, but should be avoided. $\beta > 30^\circ$ is forbidden.

Dimensions of Spherical Head Anchor, offset versions

Load group	Designation mill finish	Order nr. 0735.030-	l [mm]	d [mm]	d ₁ [mm]	d ₂ [mm]	h [mm]	k [mm]	D _a [mm]
1.3	6002- 1.3-0227	00001	227	10	19	25	50	10	60
2.5	6002- 2.5-0268	00002	268	14	26	35	50	11	74
4.0	6002- 4.0-0406	00003	406	18	36	45	60	15	94
5.0	6002- 5.0-0466	00004	466	20	36	50	60	15	94
7.5	6002- 7.5-0664	00005	664	24	46	60	70	15	118
10.0	6002-10.0-0667	00006	667	28	46	70	70	15	118
15.0	6002-15.0-0825	00007	825	34	69	85	70	15	160
20.0	6002-20.0-0986	00008	986	38	88	98	90	15	160

Dimensions of Spherical Head Rod Anchor, offset versions

Load group	Designation mill finish	Order nr. 0735.080-	l [mm]	d [mm]	d ₁ [mm]	h [mm]	k [mm]	D _a [mm]
2.5	6052- 2.5-0508	00002	508	14	26	50	11	74
5.0	6052- 5.0-0885	00004	885	20	36	60	15	94
7.5	6052- 7.5-1134	00006	1134	24	46	70	15	118
10.0	6052-10.0-1284	00008	1284	28	46	70	15	118
15.0	6052-15.0-1535	00010	1535	34	69	70	15	160



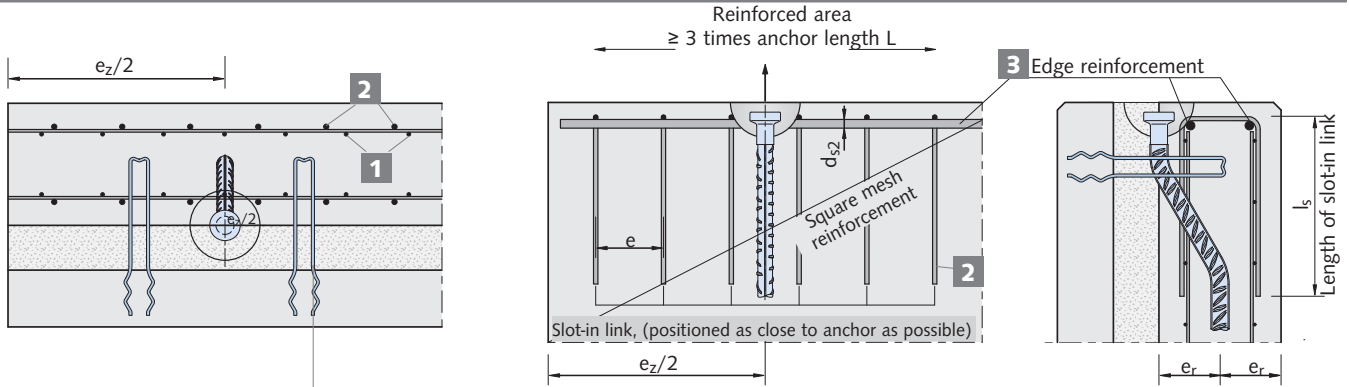
This helps to avoid anchor bending and concrete spalling.

⚠ If casting with outer skin on top of the sandwich, tilt-up table is recommended

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Sandwich Panel Anchor and Spherical Head Rod Anchor, offset versions

Load capacity and reinforcement of sandwich Panel Anchor and Spherical Head Rod Anchor, offset versions



We recommend additional sandwich anchor pins each side of the anchor

Reinforcement and load capacity of Spherical Head Anchor, offset versions with axial pull up to $\beta = 30^\circ$

Load group	Designation mill finish	Element thickness $2 \times e_r$ [mm]	Distance between anchors e_z ① [mm]	Reinforcement			Load capacity (kN) for				
				1 Square mesh reinforcement mm^2/m	2 Slot-in link		3 Edge reinforcement d_{s2} [mm]	Axial pull		Transverse pull (pitching)	
					d_s [mm]	l_s [mm]		at concrete strength			
					15 N/mm ²	25 N/mm ²	15 N/mm ²	25 N/mm ²			
1.3	6002- 1.3-0227	80	260	2×66	$\varnothing 6$	400	$2 \times \varnothing 10$	13.0	13.0	6,5	6,5
2.5	6002- 2.5-0268	100	370	2×131	$\varnothing 8$	500	$2 \times \varnothing 10$	15,9	20,3	9,5	12,2
		140						20,5	25,0	12,2	12,5
4.0	6002- 4.0-0406	100	640	2×131	$\varnothing 8$	750	$2 \times \varnothing 10$	27,3	35,2	18,5	20,0
		140						35,1	40,0	20,0	
5.0	6002- 5.0-0466	100	820	2×131	$\varnothing 8$	750	$2 \times \varnothing 10$	35,2	45,4	21,2	25,0
		140						45,3	50,0	25,0	
7.5	6002- 7.5-0664	120	1210	2×188	$\varnothing 10$	1000	$2 \times \varnothing 12$	50,9	65,8	30,5	37,5
		150						60,2	75,0	36,0	
10.0	6002-10.0-0667	140	1220	2×188	$\varnothing 10$	1000	$2 \times \varnothing 12$	66,5	86,0	39,9	50,0
		180						80,3	100,0	48,2	
15.0	6002-15.0-0825	180	1500	2×188	$\varnothing 10$	1000	$2 \times \varnothing 14$	103,2	133,0	61,9	75,0
		220						120,0	150,0	72,0	
20.0	6002-20.0-0986	200	2030	2×257	$\varnothing 12$	1100	$2 \times \varnothing 14$	135,1	174,4	81,1	100,0
		250						159,7	200,0	95,9	

① e_z = min. distance between anchors; $e_z/2$ = min. edge distance

Reinforcement and load capacity of Spherical Head Rod Anchor, offset versions with axial pull up to $\beta = 30^\circ$

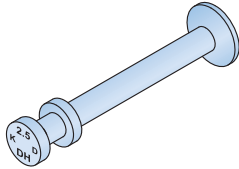
Load group	Designation mill finish	Element thickness $2 \times e_r$ [mm]	Distance between anchors e_z ① [mm]	Reinforcement			Load capacity (kN) for				
				1 Square mesh reinforcement mm^2/m	2 Slot-in link		3 Edge reinforcement d_{s2} [mm]	Axial pull		Transverse pull (pitching)	
					d_s [mm]	l_s [mm]		at concrete strength			
					15 N/mm ²	25 N/mm ²	15 N/mm ²	25 N/mm ²			
2.5	6052- 2.5-0508	80	370	2×131	$\varnothing 8$	700	$2 \times \varnothing 10$	25,0	25,0	12,5	12,5
5.0	6052- 5.0-0885	100	820	2×131	$\varnothing 8$	820	$2 \times \varnothing 10$	40,9	50,0	24,5	25,0
		120						44,2	50,0	25,0	
		140						47,1	50,0	25,0	
		160						50,0	50,0	25,0	
7.5	6052- 7.5-1134	120	1210	2×188	$\varnothing 10$	950	$2 \times \varnothing 12$	66,1	75,0	37,5	37,5
		140						70,1	75,0	37,5	
		160						75,0	75,0	37,5	
10.0	6052-10.0-1284	140	1220	2×131	$\varnothing 10$	1000	$2 \times \varnothing 12$	100,0	100,0	50,0	50,0
15.0	6052-15.0-1535	160	1500	2×131	$\varnothing 10$	1200	$2 \times \varnothing 14$	150,0	150,0	75,0	75,0

① e_z = min. distance between anchors; $e_z/2$ = min. edge distance

DEHA LIFTING ANCHOR SYSTEM

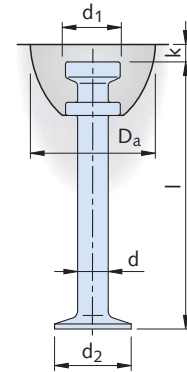
Quick Fitting Spherical Head Anchor DSM

Dimensions and load capacity of Quick Fitting Spherical Head Anchor DSM



This anchor is designed with a collar below the anchor head, so that when pushed into the former, the collar makes a seal.

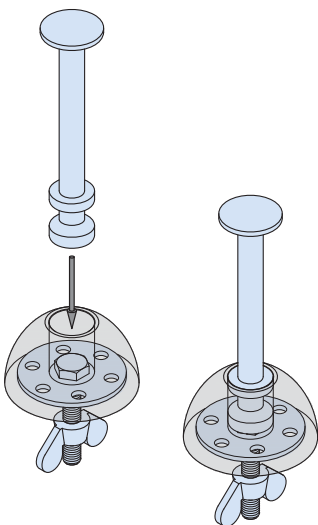
Assembly is quicker and when demoulding the former stays on the mould. This is particularly useful for negative casting such as balconies or staircases.



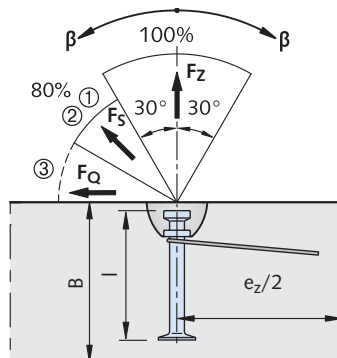
The load capacity is the same as normal anchors type 6000 and the anchor suits the same lifting links. The anchor is used with DSM recess formers code 6126; 6127 and 6128. Usually the anchor is pushed into the former with an oil based lubricant.

Dimensions of Quick Fitting Spherical Head Anchor DSM								
Load group	Designation mill finish	Order nr. 0735.110-	l [mm]	d [mm]	d ₁ [mm]	d ₂ [mm]	k [mm]	D _a [mm]
1.3	6073-1.3-0065	00005	65	10	18	25	10	10
	6073-1.3-0120	00004	120	10	18	25	10	10
2.5	6073-2.5-0085	00001	85	14	25	35	11	11
	6073-2.5-0120	00002	120	14	25	35	11	11
	6073-2.5-0170	00003	170	14	25	35	11	11
5.0	6073-5.0-0110	00006	110	20	36	50	15	15
	6073-5.0-0240	00007	240	20	36	50	15	15

Load capacity when lifting slabs with any direction of pull								
Load group	Designation mill finish	Length of anchor l [mm]	slab thickness B _{min} [mm]	Distance between anchors e _z [mm]	Load capacity (kN) for			
					Axial pull up to 30° [β]	Angled pull up to 45° [β]	Axial pull and Angled pull up to 45° [β]	
					15 N/mm ²	15 N/mm ²	25 N/mm ²	35 N/mm ²
1.3	6073-1.3-0065	65	100	≥ 300	13.0	10.4	13.0	13.0
2.5	6073-2.5-0085	85	120	≥ 380	19.5	15.6	25.0	25.0
5.0	6073-5.0-0110	110	150	≥ 500	29.5	23.6	38.1	45.1



With reinforcement for angled pull



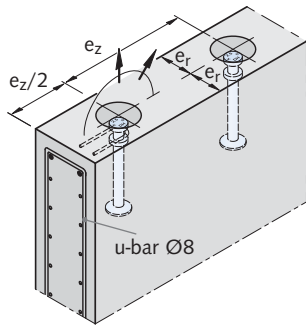
- ① Angled pull at $\beta > 30^\circ$ without reinforcement for angled pull is only allowed at:
 - Concrete strength 15 N/mm² and wall thickness 3 times minimum thickness $e_z/2$
 - Concrete strength 25 N/mm² and wall thickness 2.5 times minimum thickness $e_z/2$
 - Concrete strength 35 N/mm² and wall thickness 2 times minimum thickness $e_z/2$
- ② At a concrete strength $> 23\text{N/mm}^2$ $F_z = F_s$.
- ③ Angled pull with $\beta > 60^\circ$ caused by spread of cables/chains is not permitted!

! Handling reinforcement for the slab as a whole must be designed by others

DEHA LIFTING ANCHOR SYSTEM

Quick Fitting Spherical Head Anchor DSM

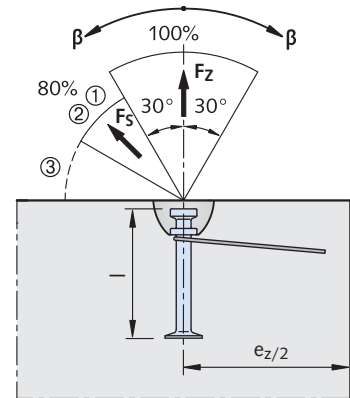
Load capacity of Quick Fitting Spherical Head Anchor DSM in walls and beams



Required reinforcement **1, 2, 3**, reinforcement **4** only with angled pull (reinforcement see page 16)

- ① Angled pull at $\beta > 30^\circ$ without reinforcement for angled pull is only allowed at:
 - Concrete strength 15 N/mm² and wall thickness 3 times minimum thickness $2 \times e_r$
 - Concrete strength 25 N/mm² and wall thickness 2.5 times minimum thickness $2 \times e_r$
 - Concrete strength 35 N/mm² and wall thickness 2 times minimum thickness $2 \times e_r$
- ② At a concrete strength $> 23\text{N/mm}^2$ $F_z = F_s$.
- ③ Angled pull with $\beta > 60^\circ$ caused by spread of cables/chains is not permitted!

With reinforcement for angled pull



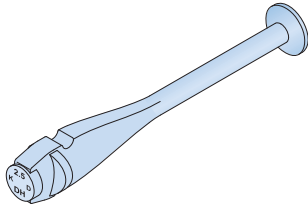
Load capacity when lifting walls and beams

Load group	Designation	Length of anchor l [mm]	Minimum height of beams B ₁ [mm]	Min. wall thickness or beam width $2 \times e_r$ [mm]	Distance between anchors e _z [mm]	Load capacity (kN) for			
						Axial pull up to 30° [β]	Angled pull up to 45° [β]	Axial pull and Angled pull up to 45° [β]	
								at concrete strength	
						15 N/mm ²	15 N/mm ²	25 N/mm ²	35 N/mm ²
1.3	6073-1.3-0120	120	250	80	≥ 300	13,0	10,7	13,0	13,0
				100		13,0	12,7		
				120		13,0	13,0		
2.5	6073-2.5-0120	120	250	120	≥ 380	18,1	14,5	23,3	25,0
				140		20,3	16,2	25,0	
				160		22,4	17,9	25,0	
	6073-2.5-0170	170	350	100	≥ 380	20,7	16,5	25,0	25,0
				120		23,7	19,0		
				140		25,0	21,8		
5.0	6073-5.0-0240	240	500	200	≥ 500	45,6	36,5	50,0	50,0
				220		49,0	39,2		
				240		50,0	41,9		

DEHA LIFTING ANCHOR SYSTEM

Spherical Head Tilt-up Anchor

Dimensions, load capacity and reinforcement of Spherical Head Tilt-up Anchor

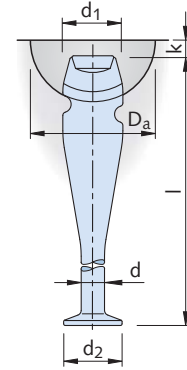


These anchors are used to pitch and transport thin concrete units such as walls or beams.

They are used, if no tilt-up table is available.

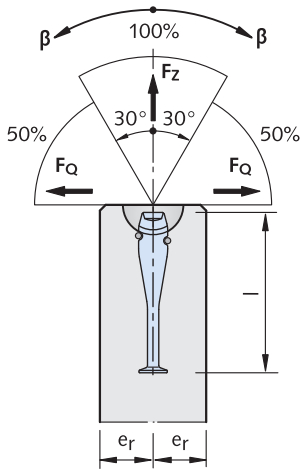
The head dimensions are standard and suit the universal head lifting link.

The anchors are installed with 6134 recess former and are available in 2.5t and 5.0t load groups.

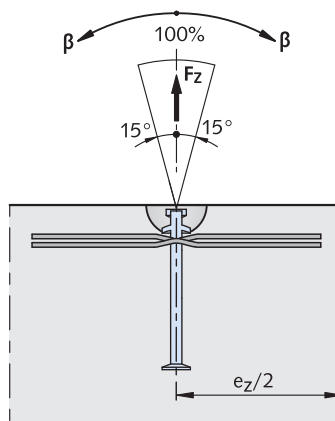


Dimensions of Spherical Head Tilt-up Anchor										
Load group	Designation mill finish	Order no. 0735.120-	Designation <i>hot-dip galvanised</i>	Order no. 0735.120-	l [mm]	d [mm]	d ₁ [mm]	d ₂ [mm]	k [mm]	D _a [mm]
2.5	6006-2.5-0240 WB	00001	<i>6006-2.5-0240 FV</i>	<i>00151</i>	240	14	25	35	11	74
5.0	6006-5.0-0240 WB	00002	<i>6006-5.0-0240 FV</i>	<i>00152</i>	240	20	36	50	15	94

Pitching



Transport



Required reinforcement **1 - 3**.
 The reinforcement for angled pull can be replaced by pitching reinforcement on both sides.
 Page 16 – Reinforcement in walls.

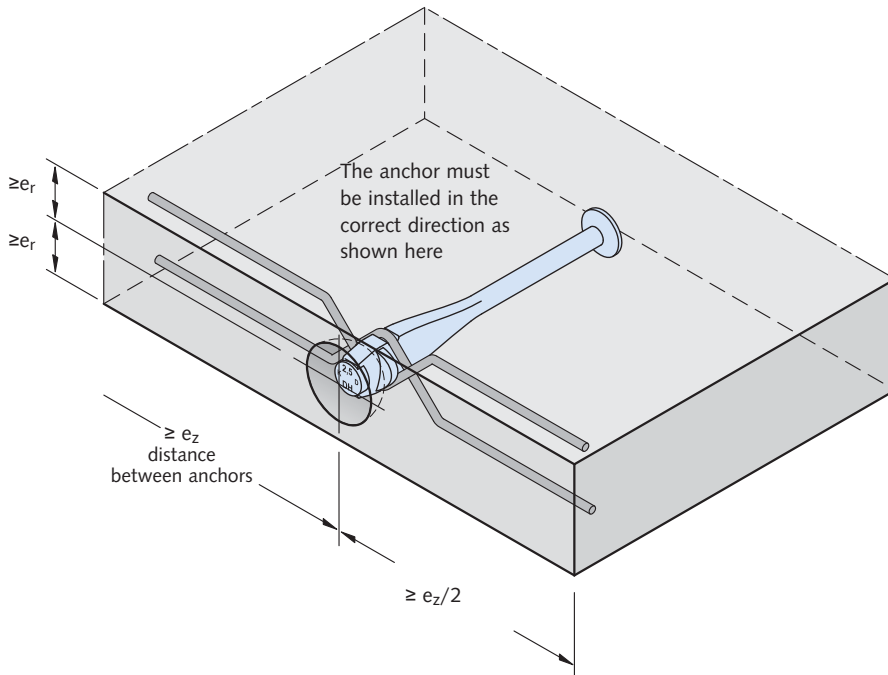
Load capacity and reinforcement of Spherical Head Tilt-up Anchor

Load group	Designation mill finish	Element thickness 2 × e _r [mm]	end edge distance e _z / 2 [mm]	Square mesh reinforcement mm ² /m	Tilt-up reinforcement BSt 500 S		Load capacity (kN) for			
					d _s [mm]	l _s [mm]	Transverse pull (tilt-up)		Axial pull and angled pull up to 30° [β]	
							15 N/mm ²	25 N/mm ²	15 N/mm ²	25 N/mm ²
2.5	6006-2.5-0240	100	765	2 × 131	Ø12	800	7,8	10,1	22,2	25,0
		110					9,0	11,6	23,8	25,0
		120					10,3	12,5	25,0	25,0
		130					11,6	12,5	25,0	25,0
		140					12,5	12,5	25,0	25,0
5.0	6006-5.0-0240	120	765	2 × 131	Ø16	1000	13,8	17,8	31,2	40,0
		130					14,6	18,8	33,1	42,7
		140					15,6	20,1	35,0	45,2
		150					17,3	22,3	36,8	47,5
		160					19,1	24,6	38,7	50,0
		180					20,9	25,0	42,2	50,0
		200					22,6	25,0	45,7	50,0

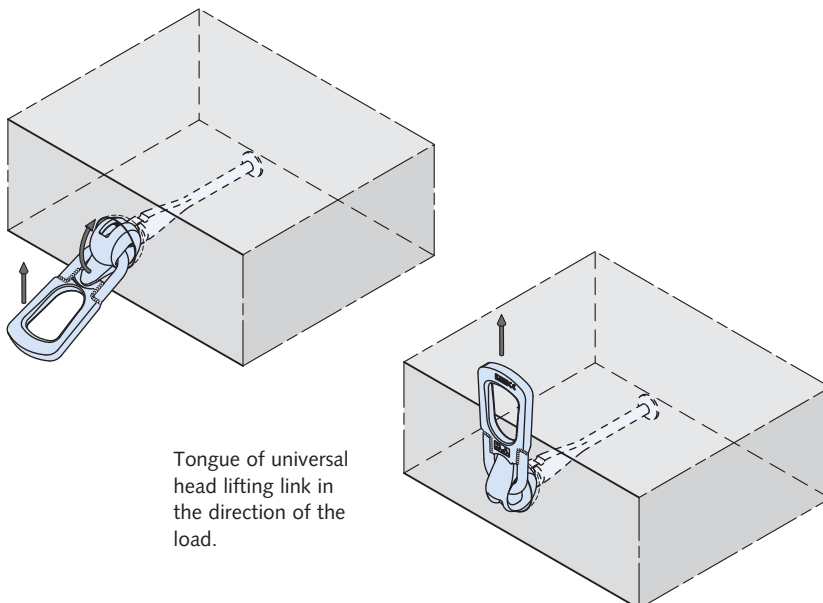
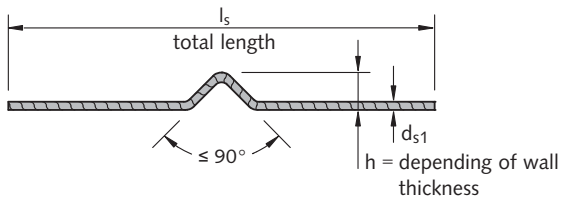
DEHA LIFTING ANCHOR SYSTEM

Spherical Head Tilt-up Anchor

Handling



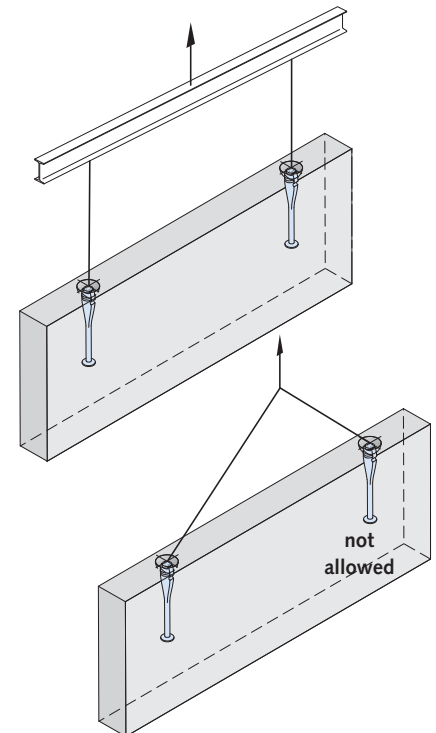
The pitching reinforcement is positioned into the notch of the anchor



Method of Use

We recommend pitching reinforcement both sides of the anchor as shown. When installing the lifting link, take care that the anchor has been installed in the correct direction and that the tongue of the link is in the direction of the load. The design of the anchor head ensures that the load is applied to the steel of the anchor when pitching.

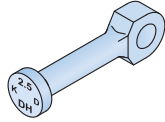
The tilt-up anchor is only allowed to be loaded with axial load or transversal load. Angled pull is not permitted. Pitching has to be done using a spreader beam.



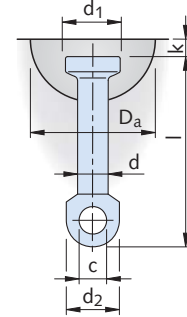
DEHA LIFTING ANCHOR SYSTEM

Spherical Head Eye Anchor

Dimensions, load capacity and reinforcement of Spherical Head Eye Anchor



This anchor is used with a reinforcement tail for applications where the load cannot be taken by the foot of an anchor. For example thin elements such as roof beams or double "T"-beams.



The anchor is also suitable for lightweight concrete as the load is transferred over the large area of reinforcement tail.

Note: all the load is transferred to the ribs of the rebar tail.

The tail must be installed tight to the base of the hole in the anchor.

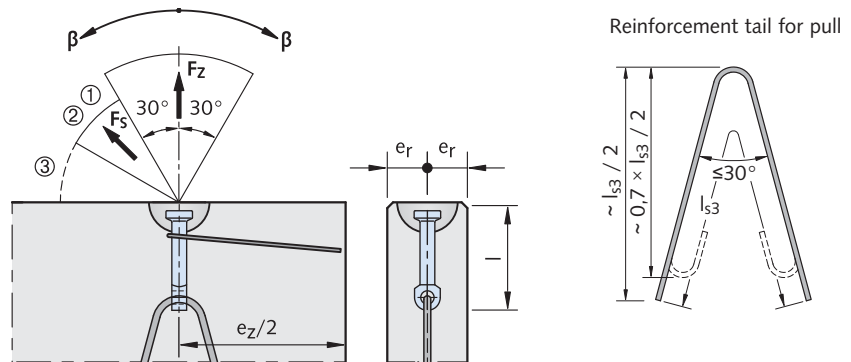
The tail must be bent with an internal angle of 30° as shown.

The tail may be shortened if required by forming of end hooks as shown.

The reinforcement tail is essential. The anchor must not be used without the tail.

Load group	Designation mill finish	Order no. 0735.050-	l [mm]	d [mm]	d ₁ [mm]	d ₂ [mm]	c [mm]	k [mm]	D _a [mm]
1.3	6001- 1.3-0065	00001	65	10	19	19	10	10	60
2.5	6001- 2.5-0090	00002	90	14	26	27	13	11	74
5.0	6001- 5.0-0120	00003	120	20	36	42	20	15	94
10.0	6001-10.0-0180	00004	180	28	46	57	25	15	118
20.0	6001-20.0-0250	00005	250	39	69	76	37	15	160

With reinforcement for angled pull



Required reinforcement 4 only with angled pull (reinforcement see page 16)

- ① Angled pull at $\beta > 30^\circ$ without reinforcement for angled pull is only allowed at:
 - concrete strength 15 N/mm² and wall thickness 3 times minimum thickness $2 \times e_r$
 - concrete strength 25 N/mm² and wall thickness 2.5 times minimum thickness $2 \times e_r$

- concrete strength 35 N/mm² and wall thickness 2 times minimum thickness $2 \times e_r$
- ② At a concrete strength $> 23\text{N/mm}^2$ $F_z = F_s$.
- ③ Angled pull with $\beta > 60^\circ$ caused by spread of cables/chains is not permitted!

⚠ The angled pull reinforcement has to be placed as close as possible under the recess former and has to be installed with full contact to the anchor.

Load capacity and reinforcement of Spherical Head Eye Anchor

Load group	Designation mill finish	Element thickness $2 \times e_r$ [mm]	Distance between anchors e_z [mm]	Square mesh reinforcement-both-sides mm^2/m	d_{s3} [mm]	Reinforcement tail			Load capacity (kN) for	
						Concrete strength			Axial pull	Angled pull
						15 N/mm ²	25 N/mm ²	35 N/mm ²	up to 30° [β]	up to 45° [β]
									at concrete strength	
									15 N/mm ²	15 N/mm ²
1.3	6001- 1.3-0065	80	500	188	10	650	510	420	13.0	10,2
2.5	6001- 2.5-0090	80	600	188	12	1000	800	650	25.0	20.0
5.0	6001- 5.0-0120	100	750	188	16	1700	1350	1100	50,0	40,0
10.0	6001-10.0-0180	140	1200	188	20	2000	1600	1300	100,0	80,0
20.0	6001-20.0-0250	180	1500	188	32	3000	2400	1950	200,0	160,0

DEHA LIFTING ANCHOR SYSTEM

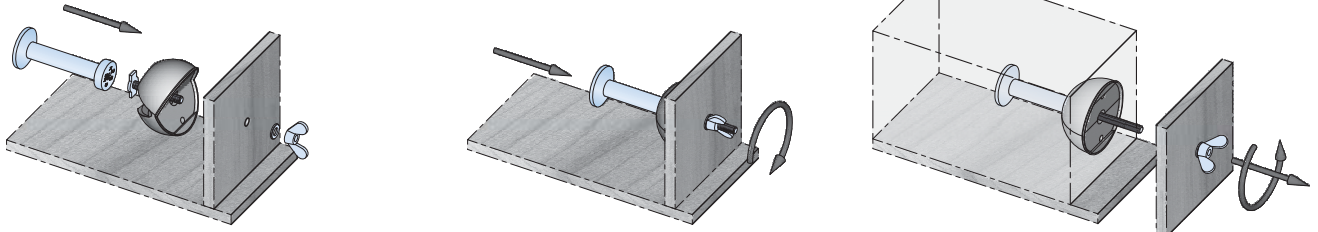
Installation and Removal

Installation of the DEHA Anchor using Rubber Recess Former

In most cases the recess former is ordered with the preinstalled locating plate. If not, the recess former is opened and the locating plate together

with the head of the Anchor is inserted into the recess former. The recess former is then fixed to the formwork using a wing nut.

Finally the recess former is tightened to the formwork and simultaneously closed around the anchor head, holding it firmly in position.

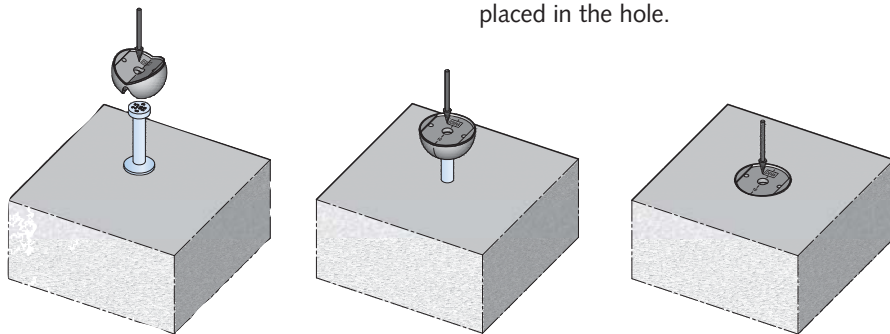


Installation in slabs

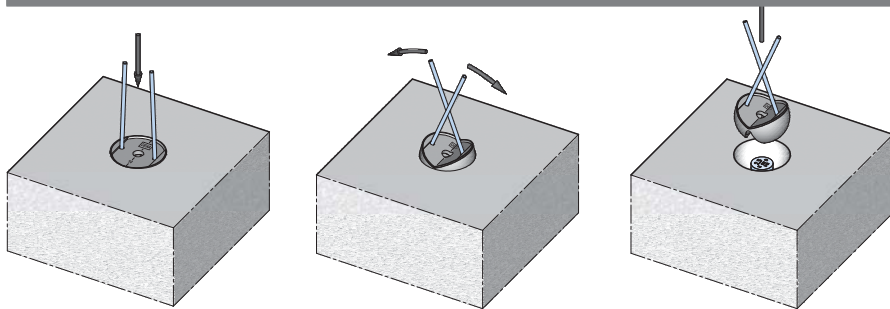
If the anchor is to be cast in the top of concrete, e.g. in slab elements then a

wedge of concrete is removed and the recess former with the anchor, is then placed in the hole.

The concrete should be vibrated until the upper surface of the former is flush with the surface of the concrete. Care should be taken to ensure that a plate (Art. No. 6141 or 6153) is in the recess former, to keep the anchor tight at the correct level. The anchors must be installed perpendicular to the formwork. The use of formwork oil especially inside the recess formers eases the removal and has a positive effect on the lifespan of the recess former.

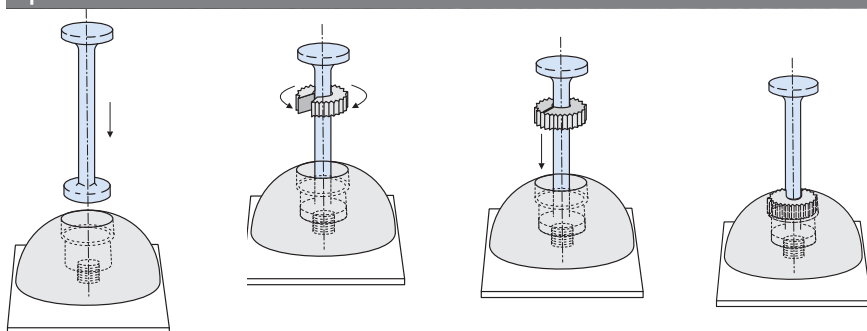


Removal of the DEHA Rubber Recess Former



On the outside of the recess former there are two holes, to help lever the former out of the hardened concrete. Two reinforcement bars can be inserted in these holes and crossed against each other to open and to remove the recess former. Excess concrete should be removed.

Spherical Head Anchor installation with Rubber Grommet in Steel Recess Former.



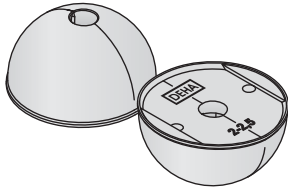
Slide the rubber grommet on to the anchor and press into the hole in the recess former. If necessary, grease before use. The anchor must be a tight fit to ensure it does not slip out during the pour.

DEHA LIFTING ANCHOR SYSTEM

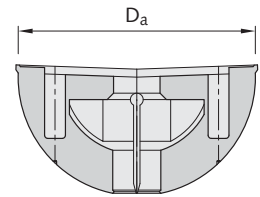
Recess Formers

To fix the Spherical Head Anchors to the formwork a Deha Recess former must be used. This ensures simple and secure locating of the anchor and leaves the anchor ready for the correct universal head lifting link.

Rubber recess former, round shape

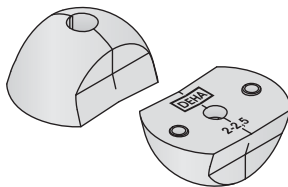


The rubber recess former is constant in shape even when heated up to 120°C or in contact with oil. It can be used several times. In order to ease the identification of the load group the formers are produced in different colours. Recess formers are used with threaded plates which may be either rod or socket (see page 41)

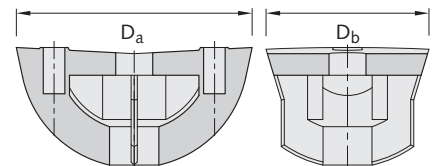


Rubber recess former, round shape								
Load group	including plate with threaded rod		including plate with socket		without threaded parts		Colour	Da [mm]
	Designation	Order no. 0736.020-	Designation	Order no. 0736.030-	Designation	Order no. 0736.010-		
1.3	6132-1.3	00001	6133-1.3	00001	6131-1.3	00001	blue	60
2.5	6132-2.5	00002	6133-2.5	00002	6131-2.5	00002	yellow	74
4.0	6132-4.0	00003	6133-4.0	00003	6131-4.0	00003	black	94
5.0	6132-5.0	00004	6133-5.0	00004	6131-5.0	00004	blue	94
7.5	6132-7.5	00005	6133-7.5	00005	6131-7.5	00005	red	118
10.0	6132-10	00006	6133-10	00006	6131-10	00006	yellow	118
15.0	6132-15	00007	6133-15	00007	6131-15	00007	gray	160
20.0	6132-20	00008	6133-20	00008	6131-20	00008	black	160
32.0/45.0	6132-32	00009	6133-32	00009	6131-32	00009	black	214

Rubber recess former, narrow shape



The narrow rubber recess former is used when the load is only in one direction. It is constant in shape even when heated up to 120°C or in contact with oil. It can be used several times. All of the narrow recess formers are coloured black.

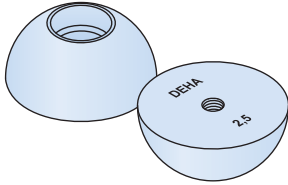


Rubber recess former, narrow shape									
Load group	including plate with threaded rod		including plate with socket		without threaded parts		Colour	Da [mm]	Db [mm]
	Designation	Order no. 0736.070-	Designation	Order no. 0736.080-	Designation	Order no. 0736.060-			
1.3	6138-1.3	00001	6145-1.3	00001	6137-1.3	00001	black	62	42
2.0/2.5	6138-2.0/2.5	00002	6145-2.0/2.5	00002	6137-2.0/2.5	00002		77	52
4.0	6138-4.0	00003	6145-4.0	00003	6137-4.0	00003		97	69
5.0	6138-5.0	00004	6145-5.0	00004	6137-5.0	00004		97	69
7.5	6138-7.5	00005	6145-7.5	00005	6137-7.5	00005		122	85
10.0	6138-10	00006	6145-10	00006	6137-10	00006		122	85
15.0	6138-15	00007	6145-15	00007	6137-15	00007		164	124
20.0	6138-20	00008	6145-20	00008	6137-20	00008		164	124

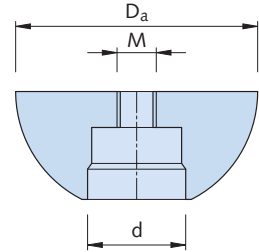
DEHA LIFTING ANCHOR SYSTEM

Recess Formers

Steel recess former, round shape



In those cases where the precast unit has to be lifted out of the mould without having access to the recess former, a special steel recess former with rubber grommet may be used.



Steel recess former, round shape

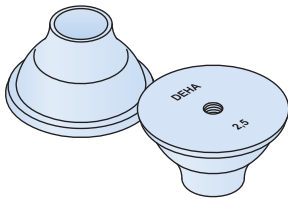
Load group	Designation	Order no. 0736.100-	D _a [mm]	M [mm]	d [mm]	Associated rubber grommet	
						Designation	Order no. 0736.060-
1.3	6150-1.3	00001	60	8	20,5	6151-1.3	00001
2.5	6150-2.5	00002	74	12	30,0	6151-2.5	00002
5.0	6150-5.0	00003	94	12	38,0	6151-5.0	00003
10.0	6150-10.0	00004	118	16	48,5	6151-10.0	00005

The anchor is placed with its head in the recess former and clamped in position by a rubber grommet. We recommend that the anchor head and the rubber grommet are treated with formwork oil before installation. When the precast unit is removed

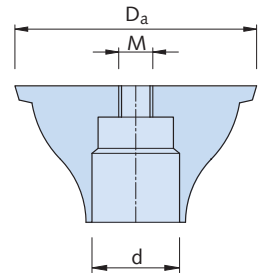
from the formwork the anchor and rubber grommet detach themselves easily from the recess former.

If this type of former is used to position the anchor horizontally within the formwork, care should be taken to prevent the anchor from becoming dislodged during pouring e.g. by fixing it to the reinforcement or securing it with spacers.

Trumpet steel recess former



The trumpet formed Steel Recess Former with rubber grommet is a special version of the recess former described above. This particular recess former enables the installation of longer lifting anchors.



Trumpet steel recess former

Load group	Designation	Order no. 0736.120-	D _a [mm]	M [mm]	d [mm]	Associated rubber grommet		
						Designation	Order no. 0737.070-	Order no. 0737.060-
1.3	6152-1.3	00001	60	8	20,5	6151-1.3 D	00001	-
						2 × 6151-1.3	-	00001
2.5	6152-2.5	00002	74	12	30,0	6151-2.5 D	00002	-
						2 × 6151-2.5	-	00002
4.0 and 5.0	6152-4.0/5.0	00003	94	12	38,0	6151-4.0 D	00003	-
						2 × 6151-5.0	-	00003

Anchors with longer embedment are better supported during the pour by the shape of this former.

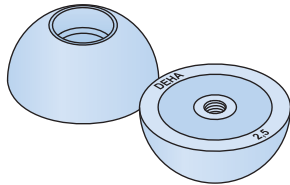
The void in the recess former is twice the length of the normal version.

It is possible to use either a long rubber grommet or two standard ones.

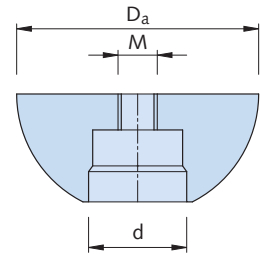
DEHA LIFTING ANCHOR SYSTEM

Recess Formers

Magnetic steel recess former, round shape



All magnetic formers are used with a rubber grommet.
By using magnetic recess formers on a steel mould, drill holes for fastening the recess former are not required.



Magnetic steel recess former, round shape

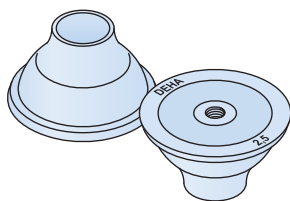
Load group	Designation	Order no. 0736.110-	D _a [mm]	M [mm]	d [mm]	Associated rubber grommet	
						Designation	Order no. 0737.060-
1.3	6150-1.3 M	00001	60	8	20,5	6151-1.3	00001
2.5	6150-2.5 M	00002	74	12	30,0	6151-2.5	00002
5.0	6150-5.0 M	00003	94	12	38,0	6151-5.0	00003

Steel Magnetic Recess Former Designation 6150-..M or Designation 6152-..M (trumpet formed)

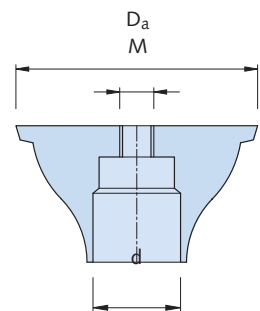
It is important that the formwork on which the recess former is fixed is clean and free from old concrete, otherwise this could have a detrimental effect on the adhesion strength.

The recess formers can be detached from the mould by screwing in a bolt to pull it away.

Magnetic trumpet steel recess former



This former is especially designed for anchors which are in a horizontal position during the pour.
The trumpet form gives better support even for longer anchors.
Details as 6150 M shown above.



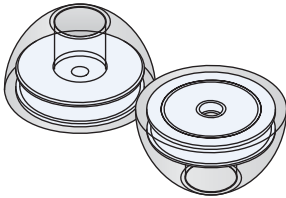
Magnetic trumpet steel recess former

Load group	Designation	Order no 0736.130-	D _a [mm]	M [mm]	d [mm]	Associated rubber grommet		
						Designation	Order no. 0737.070-	Order no. 0737.060-
1.3	6152-1.3 M	00001	60	8	20,5	6151-1.3 D	00001	-
						2 × 6151-1.3	-	00001
2.5	6152-2.5 M	00002	74	12	30,0	6151-2.5 D	00002	-
						2 × 6151-2.5	-	00002
4.0 and 5.0	6152-4.0/5.0 M	00003	94	12	38,0	6151-4.0 D	00003	-
7.5 and 10.0	6152-7.5 M	00004	134	16	48,5	6151-7.5 D	-	00004
						2 × 6151-7.5	00004	-
						2 × 6151-10.0	-	00005

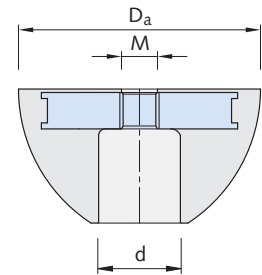
DEHA LIFTING ANCHOR SYSTEM

Recess Formers

Magnetic recess former for DSM



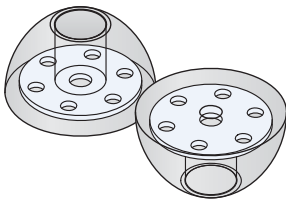
New design of recess former for rapid locating of the DSM anchor. The material is polyurethane which helps to ensure long life in casting yard. Magnetic version for steel form. The former is made so the DSM anchor is a tight push fit - no grommet required



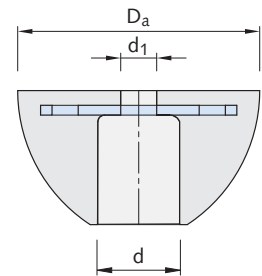
Magnetic recess former for DSM

Load group	Designation	Order no. 0736.190-	Da [mm]	M	d [mm]	Colour
1.3	6126-1.3	00001	60	8	18	transparent
2.5	6126-2.5	00002	74	12	25	
5.0	6126-5.0	00003	94	12	36	

Polyurethane recess former for DSM



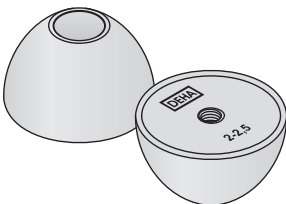
New design of recess former for rapid locating of the DSM anchor. The material is polyurethane which helps to ensure long life in casting yard. This version is fixed directly to timber formwork using holding screw S1 or may be fixed with a normal counter-sunk wood screw.



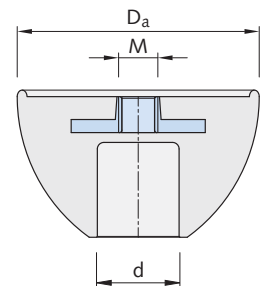
Polyurethane recess former for DSM

Load group	Designation	Order no. 0736.170-	Da [mm]	d ₁ / für M [mm]	d [mm]	Colour
1.3	6127-1.3	00001	60	10 / 8	18	transparent
2.5	6127-2.5	00002	74	12 / 10	25	
5.0	6127-5.0	00003	94	13 / 12	36	

Rubber recess former for DSM



The rubber recess former for rapid locating of the DSM anchor. This version is fixed directly to timber formwork using holding screw S1.



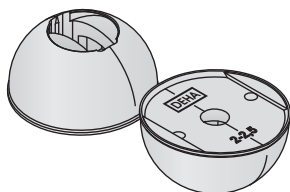
Rubber recess former for DSM

Load group	Designation	Order no. 0736.140-	Da [mm]	M [mm]	d [mm]	Colour
1.3	6128-1.3	00002	60	8	18	blue
2.5	6128-2.5	00001	74	12	25	yellow

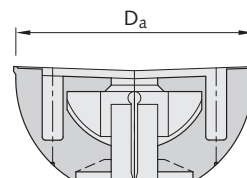
DEHA LIFTING ANCHOR SYSTEM

Recess Formers and Recess void filler

Rubber Recess Former, round shape, for Tilt-up Anchor 6006



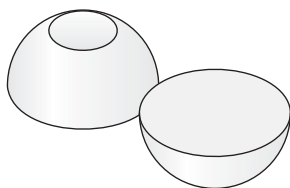
This former is similar to a normal rubber recess former but specially shaped to suit the tilt-up anchor (designation 6006). They can be reused many times.



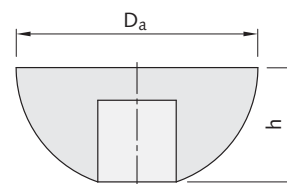
Rubber Recess Former for Tilt-up Anchor 6006

Load group	Designation	Order no. 0736.150-	Da [mm]	Colour	Associated plate
2.5	6134-2.5	00001	74	yellow	6141-2.0/2.5
5.0	6134-5.0	00002	104	blue	6141-4.0/5.0

Recess void filler

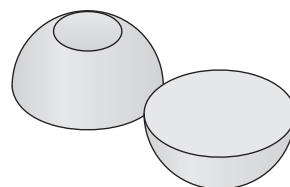


Recess void fillers made of polystyrene are available for all load groups to temporarily seal off the recess in the concrete against water and ice while in storage in the yard.

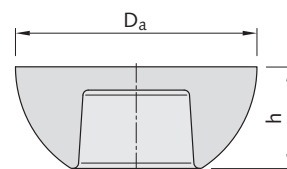


Recess void filler, Polystyrene

Load group	Designation	Order no. 0737.010-	Da [mm]	h [mm]	Colour
1.3	6015-1.3	00001	60	29	white
2.5	6015-2.5	00002	74	35	
4.0 and 5.0	6015-4.0/5.0	00003	94	44	
7.5 and 10.0	6015-7.5/10.0	00004	118	55	
15.0 and 20.0	6015-15.0/20.0	00005	94	72	



The VKF cover for the recess is manufactured from light weight fibre reinforced concrete. It is designed to provide a long-term cover for the recess and is fixed in place with mortar or resin depending on the use and site conditions.



Recess void filler, fibre reinforced concrete VKF

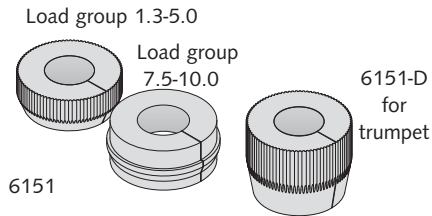
Load group	Designation	Order no. 0737.120-	Da [mm]	h [mm]	Colour
7.5 and 10.0	6172-10.0	00001	114	48	grey
15.0 and 20.0	6172-20.0	00002	156	65	
32.0 and 45.0	6172-32.0	00003	210	90	

It is available in a range of sizes to suit anchors from 7.5 t to 45.0 t

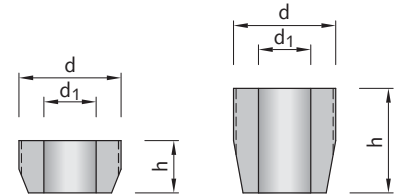
DEHA LIFTING ANCHOR SYSTEM

Accessories for Recess Formers

Rubber grommet for steel recess former



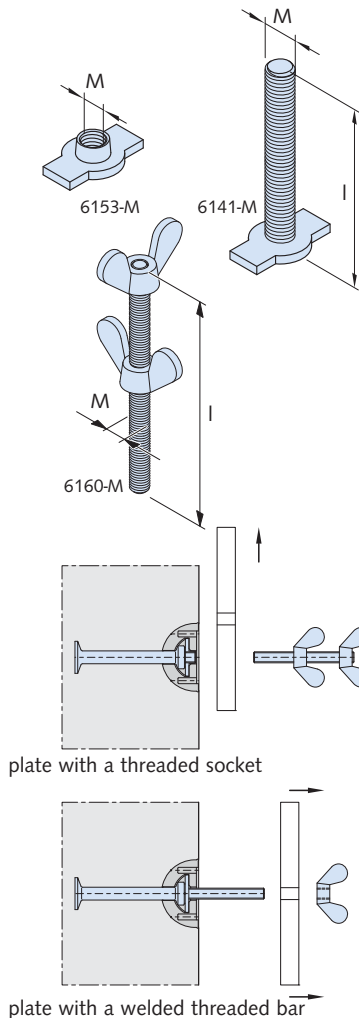
Rubber Grommet for Steel recess former 6150 and Steel recess former 6152 to fix the anchor in the recess former.



Rubber grommet

Load group	Designation Rubber grommet	Order no. 0737.060-	Designation Double rubber grommet	Order no. 0737.070-	d	d ₁	h
1.3	6151-1.3	00001	-	-	21,5	11,0	11,0
	-	-	6151-1.3 D	00001			22,0
2.5	6151-2.5	00002	-	-	30,5	14,5	12,0
	-	-	6151-2.5 D	00002			25,0
4.0	-	-	6151-4.0 D	00003	38,5	19,0	28,0
5.0	6151-5.0	00003	-	-			14,0
7.5	6151-7.5	00004	-	-	49,0	24,5	44,5
	-	-	6151-7.5 D	00004			44,5
10.0	6151-10.0	00005	-	-	49,0	28,0	44,5

Fixing Accessories for Rubber Recess Formers



Various versions of threaded plates are used to attach the Rubber Recess Formers to the mould. If the formwork can be only removed perpendicular to the threaded bar, the plates with a threaded socket should be used (6153-..). If the formwork can be removed in the direction of the threaded bar, the plates with a welded threaded bar (6141-...) should be used.

Available for all load group. If the formwork can be only removed perpendicular to the threaded bar, the plates with a threaded socket should be used (6153-..).

Plate with threaded rod

Designation	Order no. 0737.020-	Thread M	l [mm]	for load groups (Designation 6131, round)	for load groups (Designation 6137, narrow)
6141-1.3	00001	8	70	1.3 and 2.5	1.3 and 2.5
6141-2.5	00002	12		-	2.5
6141-4.0/5.0	00003	12		4.0 and 5.0	4.0 and 5.0
6141-7.5/10.0	00004	12		7.5 and 10.0	7.5 and 10.0
6141-15.0/20.0	00005	16		15.0 and 20.0	15.0 and 20.0
6151-32	00006	16		32.0	-

Plate with socket

Designation	Order no. 0737.040-	Thread M	for load groups (Designation 6131, round)	for load groups (Designation 6137, narrow)
6153-1.3	00001	8	1.3 and 2.5	1.3 and 2.5
6153-2.0/2.5	00002	12	-	2.5
6153-4.0/5.0	00003	12	4.0 and 5.0	4.0 and 5.0
6153-7.5/10.0	00004	12	7.5 and 10.0	7.5 and 10.0
6153-15.0/20.0	00005	16	15.0 and 20.0	15.0 and 20.0
6153-32 030	00006	16	32.0	-

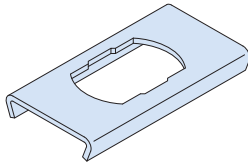
Holding bolt with wing nut

Designation	Order no. 0737.080-	Thread M	l [mm]
6160-08	00001	M 8	110
6160-12	00003	M 12	110
6160-16	00004	M 16	110

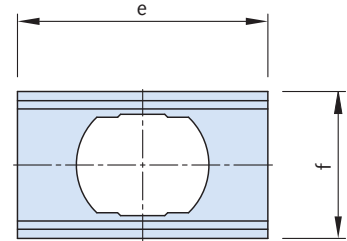
DEHA LIFTING ANCHOR SYSTEM

Accessories for Recess Formers

Pitching plate



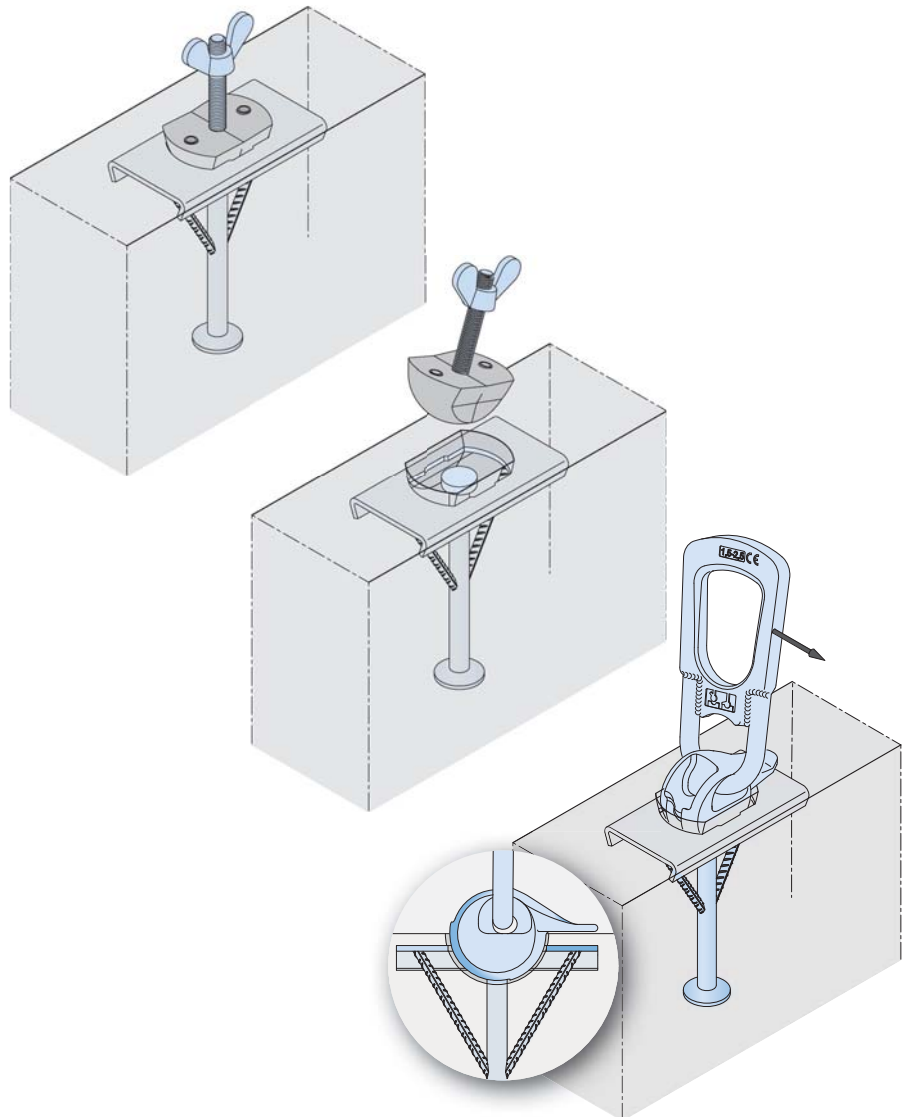
A carbon steel pitching plate may be used to help avoid the spalling of concrete when pitching/turning thin slabs or wall panels without using a tilting table.



The pitching plate is carbon steel so it is essential to ensure cover is checked. Insert the anchor into the narrow rubber recess former and install in the pitching plate. Fix the recess former in the mould in the normal way. Ensure that the pitching plate is not dilodged during placing, pouring or vibration. Pitching plate may be held in position by tack welding retaining bars.

This detail can only be used with the universal head lifting link. Ensure that the Universal-Head Lifting Link rests directly on the pitching plate to avoid local concrete spalling.

Pitching plate					
Load group	Designation	Order no. 0737.050-	e [mm]	f [mm]	Element thickness $2 \times e_f$ [mm]
1.3	6060-1.3	00001	120	65	≥ 95

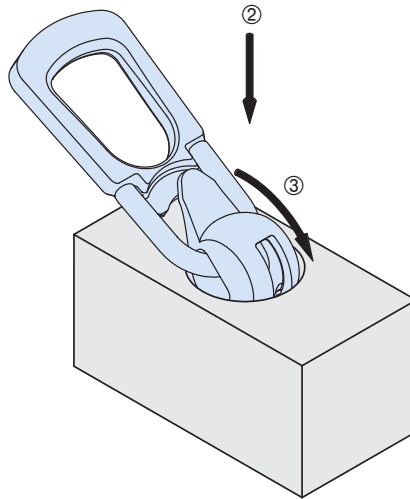


DEHA LIFTING ANCHOR SYSTEM

Lifting Links

Operating the Universal Head Lifting Link

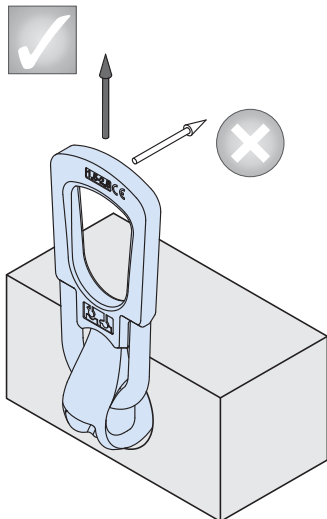
The instruction sheet for the DEHA Lifting Anchor System must be available the workplace, i.e. in the precast yard and on site. The management must make the operatives aware of the rules in this catalogue. The management must carry out inspections as shown on pages 45 and 47.



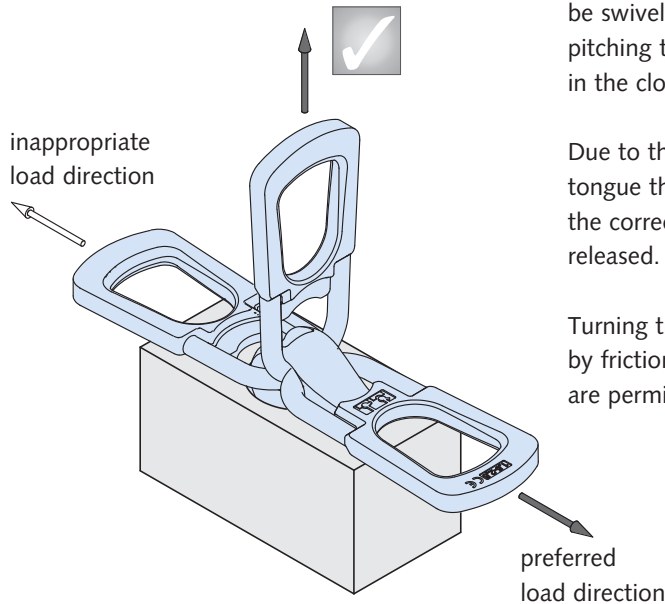
Coupling

- ① Check the load duty of the anchor
- ② To connect the lifting link to the anchor, the sphere is pushed with its opening facing downwards over the anchor.
- ③ The tongue of the sphere is then turned downwards to close around the anchor.

The Universal-Head sits in the recess and is now ready for use.



inappropriate load direction

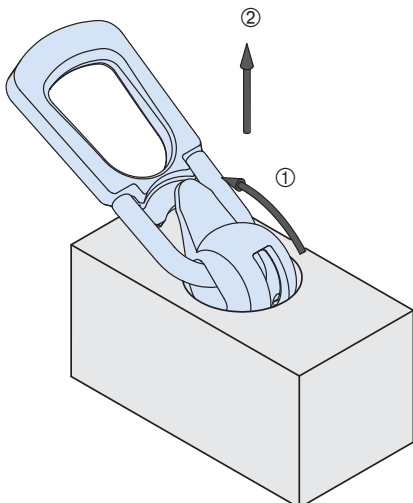


Lifting

The lifting link is suitable for axial loads and pitching. The unit can also be swivelled on the lifting link when pitching the unit, the tongue must be in the closed position as shown

Due to the counterweight of the tongue the sphere is always kept in the correct position, even if the load is released.

Turning the link under load is limited by friction. Small quantities of grease are permitted if necessary.



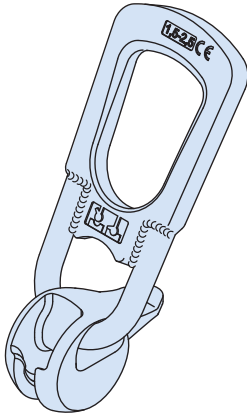
Release

- ① When the load is taken off, release the lifting link by turning the sphere with the tongue as shown.
- ② Lift the link well away and do not let it dangle over the anchor.

DEHA LIFTING ANCHOR SYSTEM

Lifting Links

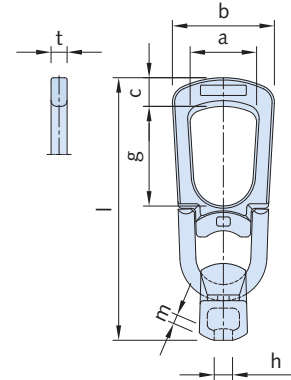
Universal-Head Lifting Link



Safety regulations in the country of use must always be observed, in particular those for the use of cranes and lifting equipment.

Do not use the Universal-Head Lifting Link in precast units that have been designed for the turning and lifting link.

The DEHA Universal-Head Lifting Link is an attachment link for the lifting and transporting of precast concrete units in combination with the Spherical Head Anchor. The Universal Head Lifting Link is a manually operated and is manufactured in the versions given in the following table. The allowable loads for individual cases must be checked using the tables for each anchor type.

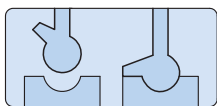


Dimensions of Universal-Head Lifting Link

Load group	Designation	Order no. 0738.010-	Weight [kg]	a [mm]	b [mm]	c [mm]	g [mm]	h [mm]	t [mm]	l [mm]	m [mm]
1.3	6102-1.3	00001	0,9	47	75	20	71	11	12	188	7,0
2.0 and 2.5	6102-1.5/2.5	00002	1,4	59	91	25	86	16	14	230	8,5
3.0 and 5.0	6102-3.0/5.0	00003	3,4	70	118	37	88	21	16	283	10,0
6.0 and 10.0	6102-6.0/10.0	00004	9,1	88	160	50	115	30	25	401	14,0
12.0 and 20.0	6102-12.0/20.0	00005	21,0	106	180	75	135	41	30	506	21,0
32.0	6102-32.0	00006	47,0	172	272	100	189	52	40	680	28,5
45.0	6102-45.0	00007	59,0	179	349	100	192	52	40	676	28,5

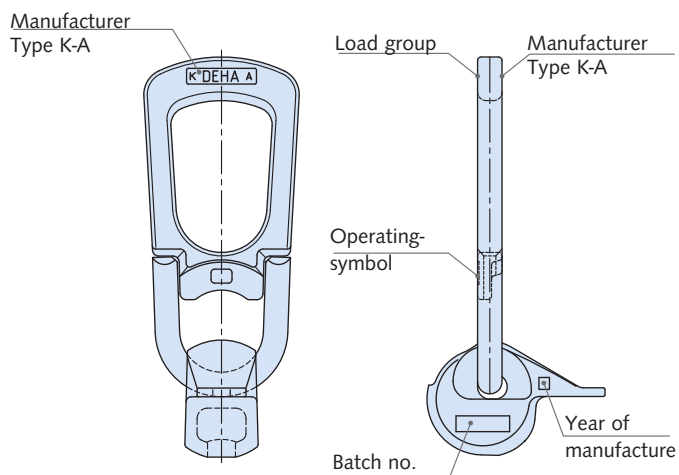
Identification

Each Universal-Head Lifting Link has identification markings as shown. The front of the handle is stamped with the name of the manufacturer (DEHA) and the identification K-A, The rear of the handle shows the load group and an operating icon.



The sphere is marked with the load group, batch number and year of manufacture.

The type identification K-A denotes that the Universal-Head Lifting Link can be used for the following two DEHA Lifting Anchor systems:



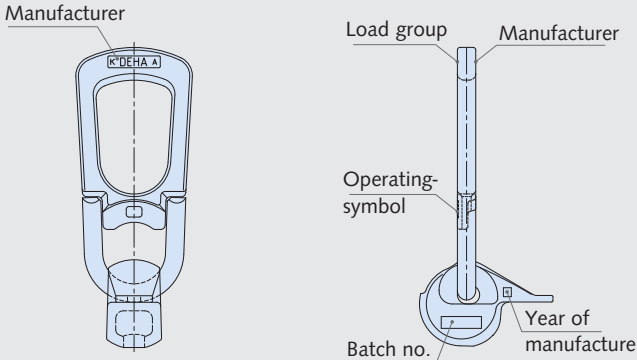
a) for the DEHA Lifting Anchor System type K with the Spherical Head Anchor

b) for the DEHA Lifting Anchor System type A with an appropriate cast in socket and adaptor.

DEHA LIFTING ANCHOR SYSTEM

Inspection procedure: Lifting Links

Inspection procedure for Universal Head Lifting Links

Company / Factory			
Stock	Date of purchase	Storage location	Notice
Load group	Year of manufacture	Batch no.	

The customer must ensure that the Universal Head lifting links are checked for any damage before use. In addition the customer must carry out full inspections at regular intervals. These must be carried out by a qualified person at intervals to suit the site conditions or in any event every year.

Reject the link if:

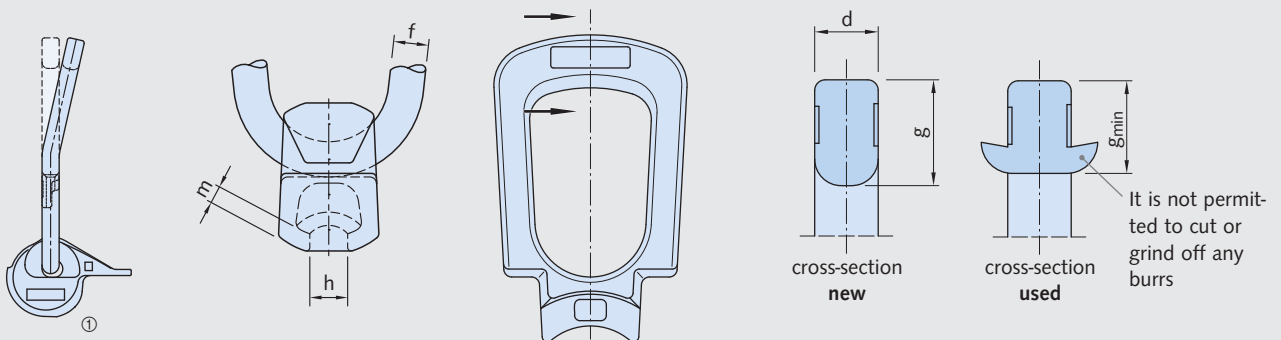
- it is deformed/bent in any way
- it is worn such that max h and min m are exceeded
- the identification lettering is worn away

Inspections must be recorded in a report showing the values measured. Records must be filed and stored in an appropriate place. As a guide experience has shown that links last approx 7 years.

Alteration and repairs to the Universal-Heads, especially welding operations, are strictly forbidden.

Limiting Dimensions for Universal-Head Lifting Link

Maximum dimension for „m“ and minimum dimension for „h“ [mm]							
Load group	1.0 and 1.3	1.5 and 2.5	3.0 and 5.0	6.0 and 10.0	12.0 and 20.0	32.0	45.0
m _{min}	5,5	6.0	8,0	12.0	18,0	24.0	24.0
h _{max}	13.0	18,0	25.0	32.0	46.0	58,0	58,0
Minimum dimension for „g“ and „f“ [mm]							
g _{min}	14.0	17.5	28,0	36.0	56.0	80,0	85.0
f _{min}	11.0	13.0	19,0	27,0	37,0	40,0	48,0

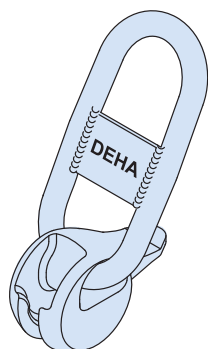


① If the link has been deformed by misuse, it must never be rebent. Reject if the link is clearly deformed.

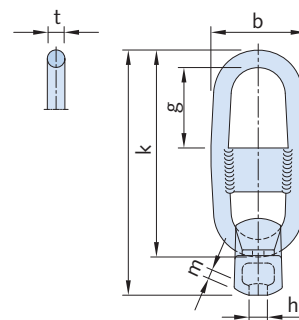
DEHA LIFTING ANCHOR SYSTEM

Lifting Links

Small Universal Head Lifting Link for limited applications



The Small Universal-Head Lifting Link for limited applications is used for lifting and transporting of precast concrete units in combination with the Spherical Head Anchor. This lifting link has been developed for the occasional use only. If used regularly there is a danger that the crane hook will deform the link.



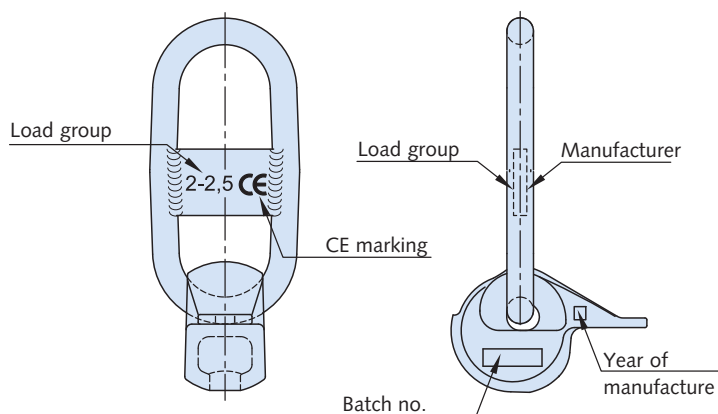
The allowable loads for individual cases must be checked using the tables for each anchor type.

Lifting Link Safety regulations in the country of use must always be observed, in particular those for the use of cranes and lifting equipment

Dimensions of Small Universal-Head Lifting Link for limited applications										
Load group	Designation	Order no. 0738.020-	Weight [kg]	l [mm]	k [mm]	g [mm]	b [mm]	t [mm]	m [mm]	h [mm]
1.3	6109-1.3	00001	0,9	162	133	46	65	Ø12	7,0	11
2.5	6109-2.0/2.5	00002	1,1	203	161	64	79	Ø14	8,5	16
4.0 and 5.0	6109-4.0/5.0	00003	4.0	249	205	70	111	Ø20	10.0	21
7.5 and 10.0	6109-7.5/10.0	00004	7,2	360	302	105	150	Ø28	14.0	30

Identification

The Small Universal Head Lifting Link for limited applications has identification markings hard stamped in the steel as shown.

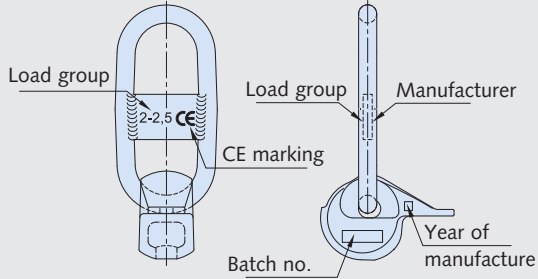


The maintenance instructions for the Small Universal Head Lifting Link are the same as for the Universal Head Lifting Link.

DEHA LIFTING ANCHOR SYSTEM

Inspection procedure: Lifting Links

Inspection procedure for Small Universal-Head Lifting Link for limited applications

Company / Factory			
Stock	Date of purchase	Storage location	Notice
Load group	Year of manufacture	Batch no.	

The customer must ensure that the Universal Head lifting links are checked for any damage before use. In addition the customer must carry out full inspections at regular intervals. These must be carried out by a qualified person at intervals to suit the site conditions or in any event every year.

Reject the link if:

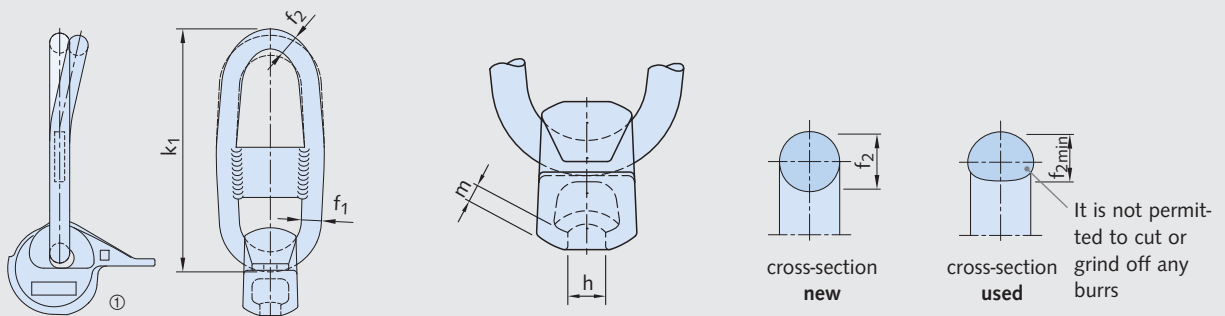
- it is deformed/bent in any way
- it is worn such that max h and min m are exceeded
- the identification lettering is worn away

Inspections must be recorded in a report showing the values measured. Records must be filed and stored in an appropriate place.

Alteration and repairs to the Universal-Heads, especially welding operations, are strictly forbidden.

Limiting Dimensions for Small Universal-Head Lifter

Maximum dimension for „m“ and minimum dimension for „h“ [mm]							
Load group	1.3	1.5 und 2.5	4.0 und 5.0	7.5 und 10.0	-	-	-
m _{min}	5,5	6,0	8,0	12,0	-	-	-
h _{max}	13,0	18,0	25,0	32,0	-	-	-
Minimum dimension for „f“ and maximum Dimension for „k“ [mm]							
k ₁	136	164	209	308	-	-	-
f _{1min} / f _{2min}	11,0	13,0	19,0	27,0	-	-	-



① If the link has been deformed by misuse, it must never be rebent. Reject if the link is clearly deformed.

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