Precast Concrete Accessories

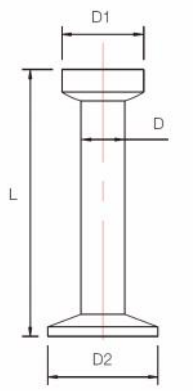
HULK Metal

Contents

Lifting Anchor System

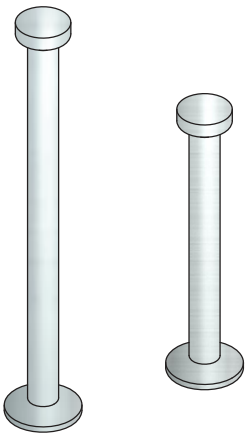
HULKMETAL

Spherical Head Lifting Anchor



Spherical Head Lifting Anchor				
MATERIAL	20Mn2 / Q345D / CM490 / Stainless Steel / Customizable			
SURFACE TREATMENT	Raw Black / Electro-galvanized / Hot-dip Galvanized			
SAFETY FACTOR	≥ 3			
CERTIFICATE	ISO9001 / CE			
SWL (tons)	CODE	LENGTH (mm)	D (mm)	WEIGHT (kg/pc)
1.3	HM-P-013035	35	10	0.04
	HM-P-013040	40	10	0.05
	HM-P-013045	45	10	0.05
	HM-P-013050	50	10	0.05
	HM-P-013055	55	10	0.06
	HM-P-013065	65	10	0.06
	HM-P-013075	75	10	0.07
	HM-P-013085	85	10	0.07
	HM-P-013120	120	10	0.09
	HM-P-013170	170	10	0.12
	HM-P-013240	240	10	0.17

SWL (tons)	CODE	LENGTH (mm)	D (mm)	WEIGHT (kg/pc)
2.5	HM-P-025045	45	14	0.11
	HM-P-025055	55	14	0.12
	HM-P-025065	65	14	0.14
	HM-P-025070	70	14	0.14
	HM-P-025075	75	14	0.15
	HM-P-025085	85	14	0.16
	HM-P-025090	90	14	0.16
	HM-P-025095	95	14	0.17
	HM-P-025100	100	14	0.18
	HM-P-025115	115	14	0.19
	HM-P-025120	120	14	0.20
	HM-P-025125	125	14	0.20
	HM-P-025140	140	14	0.21
	HM-P-025170	170	14	0.26
	HM-P-025210	210	14	0.30
	HM-P-025240	240	14	0.33
	HM-P-025280	280	14	0.38
	HM-P-025480	480	14	0.64
4.0	HM-P-040055	55	18	0.24
	HM-P-040065	65	18	0.25
	HM-P-040070	70	18	0.26
	HM-P-040075	75	18	0.27
	HM-P-040080	80	18	0.28
	HM-P-040100	100	18	0.32
	HM-P-040110	110	18	0.34
	HM-P-040140	140	18	0.40
	HM-P-040150	150	18	0.42
	HM-P-040160	160	18	0.44
	HM-P-040170	170	18	0.46
	HM-P-040180	180	18	0.48
	HM-P-040210	210	18	0.54
	HM-P-040240	240	18	0.60
	HM-P-040340	340	18	0.80
	HM-P-040420	420	18	0.96



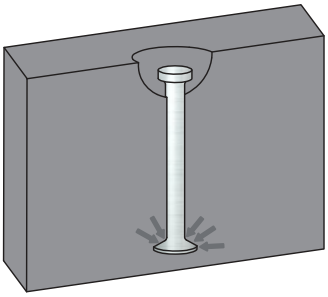
HULK Metal's spherical head anchors are made from round steel, such as Q345, 20Mn2, CM490, and stainless steel. The load capacities of these anchors are from 1.3 to 32 tons, with safety factor of at least 3 times which makes them suitable for working with higher loads.The length of the spherical anchors are various, depending on their specific application. Therefore, it is important to choose suitable length when lifting different units.Common surface treatments for spherical head anchors are hot-dip galvanized, electro-galvanized, and raw color. The spherical head anchor passed CE-certified. They are also manufactured in ISO 9001-certified workshop which can ensure higher quality. Installation and usage information are displayed on Page 9-10.

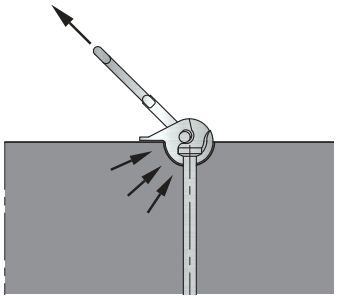
SWL (tons)	CODE	LENGTH (mm)	D (mm)	WEIGHT (kg/pc)
5.0	HM-P-050055	55	20	0.27
	HM-P-050060	60	20	0.29
	HM-P-050065	65	20	0.30
	HM-P-050075	75	20	0.32
	HM-P-050080	80	20	0.33
	HM-P-050085	85	20	0.34
	HM-P-050090	90	20	0.36
	HM-P-050095	95	20	0.37
	HM-P-050100	100	20	0.38
	HM-P-050110	110	20	0.40
	HM-P-050120	120	20	0.44
	HM-P-050140	140	20	0.49
	HM-P-050150	150	20	0.51
	HM-P-050160	160	20	0.52
	HM-P-050165	165	20	0.53
	HM-P-050170	170	20	0.54
	HM-P-050180	180	20	0.57
	HM-P-050210	210	20	0.64
	HM-P-050240	240	20	0.71
	HM-P-050250	250	20	0.74
	HM-P-050300	300	20	0.85
	HM-P-050340	340	20	0.95
	HM-P-050480	480	20	1.28
	HM-P-050540	540	20	1.42
	HM-P-050680	680	20	1.76

SWL (tons)	CODE	LENGTH (mm)	D (mm)	WEIGHT (kg/pc)
7.5	HM-P-075085	85	24	0.57
	HM-P-075095	95	24	0.60
	HM-P-075100	100	24	0.62
	HM-P-075105	105	24	0.64
	HM-P-075120	120	24	0.68
	HM-P-075140	140	24	0.75
	HM-P-075150	150	24	0.79
	HM-P-075160	160	24	0.82
	HM-P-075165	165	24	0.84
	HM-P-075170	170	24	0.86
	HM-P-075200	200	24	0.96
	HM-P-075240	240	24	1.10
	HM-P-075300	300	24	1.31
	HM-P-075340	340	24	1.44
	HM-P-075540	540	24	2.15
	HM-P-075680	680	24	2.60
10.0	HM-P-100100	100	28	0.82
	HM-P-100110	110	28	0.85
	HM-P-100115	115	28	0.87
	HM-P-100120	120	28	0.90
	HM-P-100135	135	28	0.96
	HM-P-100140	140	28	0.99
	HM-P-100150	150	28	1.03
	HM-P-100160	160	28	1.08
	HM-P-100165	165	28	1.10
	HM-P-100170	170	28	1.12
	HM-P-100180	180	28	1.17
	HM-P-100200	200	28	1.27
	HM-P-100210	210	28	1.31
	HM-P-100220	220	28	1.36
	HM-P-100240	240	28	1.46
	HM-P-100250	250	28	1.50
	HM-P-100340	340	28	1.92
	HM-P-100500	500	28	2.67
	HM-P-100540	540	28	2.86
	HM-P-100650	650	28	3.38
	HM-P-100680	680	28	3.52

SWL (tons)	CODE	LENGTH (mm)	D (mm)	WEIGHT (kg/pc)
15.0	HM-P-150110	110	34	1.60
	HM-P-150120	120	34	1.67
	HM-P-150140	140	34	1.81
	HM-P-150160	160	34	1.95
	HM-P-150165	165	34	1.98
	HM-P-150180	180	34	2.09
	HM-P-150200	200	34	2.22
	HM-P-150210	210	34	2.30
	HM-P-150240	240	34	2.52
	HM-P-150300	300	34	2.94
	HM-P-150340	340	34	3.23
	HM-P-150400	400	34	3.65
	HM-P-150825	825	34	6.68
	HM-P-150840	840	34	6.79
20.0	HM-P-200100	100	38	1.90
	HM-P-200165	165	38	2.48
	HM-P-200180	180	38	2.61
	HM-P-200200	200	38	2.79
	HM-P-200240	240	38	3.15
	HM-P-200250	250	38	3.24
	HM-P-200300	300	38	3.68
	HM-P-200340	340	38	4.04
	HM-P-200500	500	38	5.46
	HM-P-200750	750	38	7.69
	HM-P-2001000	1000	38	9.92
32.0	HM-P-320200	200	50	5.66
	HM-P-320250	250	50	6.40
	HM-P-320260	260	50	6.57
	HM-P-320280	280	50	6.87
	HM-P-320320	320	50	7.50
	HM-P-320500	500	50	10.26
	HM-P-320700	700	50	13.35
	HM-P-320870	870	50	15.96
	HM-P-3201000	1000	50	17.97
	HM-P-3201200	1200	50	21.05

Even in thin-walled structures, the load can be securely transmitted into the concrete. The round symmetrical shape of the anchor foot eliminates the need for specific positioning during installation. The Spherical Head Anchor offers advantages over the re-bar in terms of concentrated load distribution for typical wall thicknesses, as opposed to the gradual and supposedly gentle load transfer. Extensive tests conducted at the Technical University in Darmstadt have demonstrated that the anchor foot initiates a cone-shaped cracking pattern. Using longer anchors with greater embedments activates a larger section of concrete.

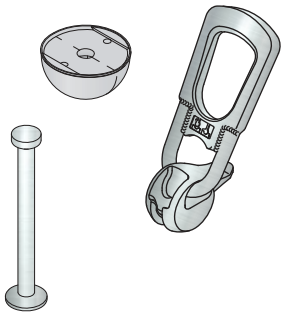




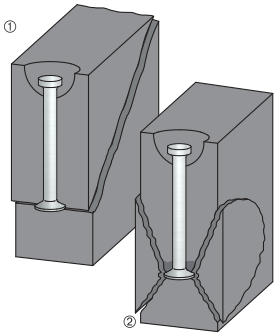
Due to the presence of corresponding Lifting Clutch and Recess Former for each lifting group, it is impossible to incorrectly couple parts from different Load groups. Another benefit is that during the diagonal pull, the Lifting Link rests against the concrete, enabling the direct transfer of horizontal load into the concrete.
Additional reinforcement is required for slope tension in thin-walled elements. However, if the transverse tension is at a 90° angle to the floor plane, meaning that the wall elements are vertically sloping, no extra reinforcement is needed (Details on page 10). Other wall units do not require additional reinforcement.

Installation Process.

1. Utilize the Recess Former to attach the Spherical Head Anchors to the specified location on the concrete block formwork prior to pouring.
2. Remove the Recess Former once the concrete block has fully dried.
3. Upon removal, the Recess Former will create a gap that accurately aligns with the Lifting Clutch.



The length of the Spherical Head Anchor is designed for optimum loading depending on the concrete cross-section and strength.
Figure 1: the expected question type.
Figure 2: the situation will not occur.

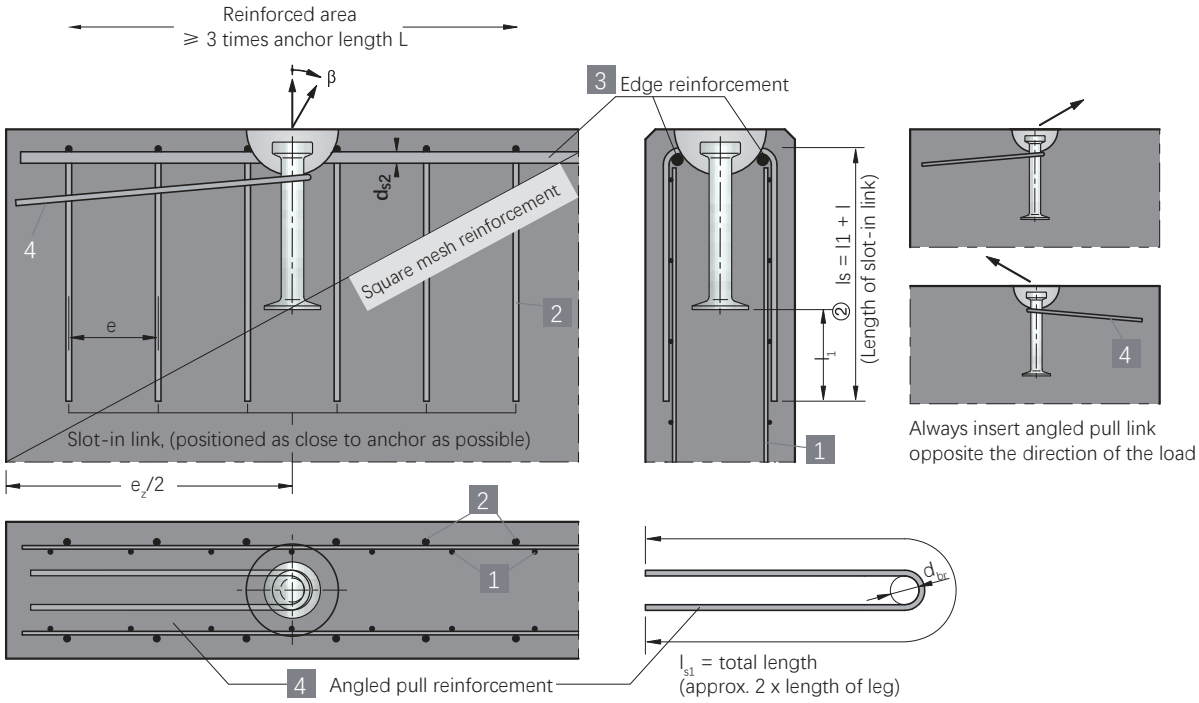


! Modifying or welding the Spherical Head Anchor is strictly prohibited as it will compromise its original properties. If modification is necessary, ensure a rigorous test is conducted before usage.

Additional Reinforcement Details for the Anchors

! The angled pull reinforcement must be placed as close as possible under the recess former and installed with the full contract 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.

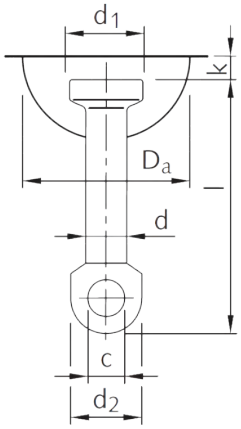


Reinforcement in Walls

Load group [t]	1 ①	2 ①②③						3 ①	4 ④⑤		
	Square Mesh Reinforcement [mm²/m]	Slot-in link BSt 500 S						Edge Reinforcement Both Sides BSt 500 S	Angled Pull Stirrup BSt 500 S		
		for axial pull ≤ 30° [β]			for angled pull > 30° [β]			both sides			
		Stuck	d_s [mm]	l_1 [mm]	Stuck	d_s [mm]	l_1 [mm]	d_{s2} [mm]	d_s1 [mm]	$d_{br}1$ [mm]	l_{s1} [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

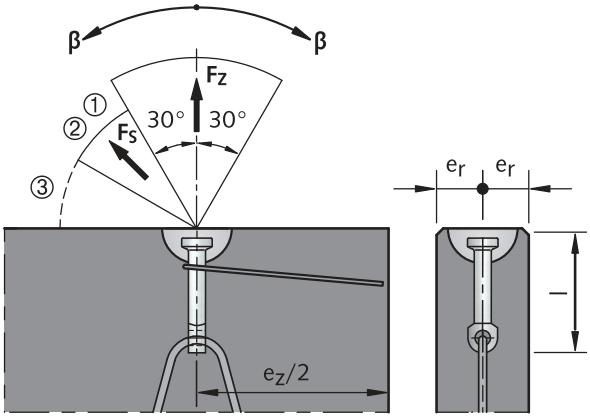
1.with very thin panels (2 × e_r ⩽ 70) the square mesh can be taken together in one layer (example 2 × 66 mm²/m required, lay 1 × 132 mm²/m in the middle). The slot in links in this case can be placed on the skew, but the edge reinforcement must be placed on both sides of the anchor.
2.The length of 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 × 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 β > 30° . 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.

Lifting Eye Anchor

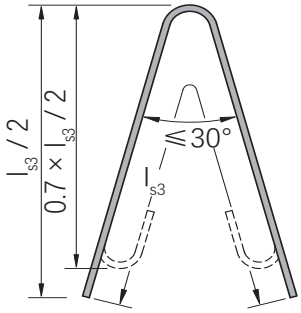


Lifting Eye Anchor				
MATERIAL	20Mn2 / Q345D / CM490 / Stainless Steel / Customizable			
SURFACE TREATMENT	Raw Black / Electro-galvanized / Hot-dip Galvanized			
SAFETY FACTOR	≥ 3			
CERTIFICATE	ISO9001 / CE			
SWL (tons)	**CODE**	**LENGTH (mm)**	**d (mm)**	**WEIGHT (kg/pc)**
1.3	HM-E-013050	50	10	0.06
	HM-E-013065	65	10	0.07
	HM-E-013120	120	10	0.10
2.5	HM-E-025090	90	14	0.17
	HM-E-025120	120	14	0.21
5.0	HM-E-050090	90	20	0.36
	HM-E-050120	120	20	0.43
	HM-E-050180	180	20	0.58
10.0	HM-E-100115	115	28	0.81
	HM-E-100180	180	28	1.14
20.0	HM-E-200250	250	38	3.28
32.0	HM-E-320300	300	50	6.31

Dimensions, Load Capacity and Reinforcement of Spherical Head Eye Anchor



1. Angled pull at β > 30° with -out reinforcement for the angled pull is only allowed at: Concrete strength 15 N/mm² and wall thickness 3 times minimum thickness 2×er. Concrete strength 25 N/mm² and wall thickness 2.5 times minimum thickness 2 x er.



2. At a concrete strength > 23N/mm². $F_z = F_s$.

3. Angled pull with β > 60° caused by the spread of cables/chains is not permitted!

Lifting Eye Anchors should be used with a reinforcement tail together when the spherical head anchor cannot bear the load. Such as roof beams or double "T"-beams.

Lifting eye anchors are also suitable for lightweight concrete as the load is transferred over the large area of the reinforcement tail.

Warning:

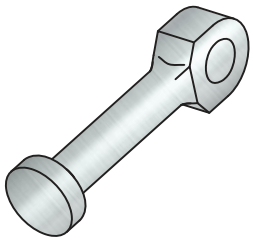
All the load is transferred to the ribs of the rebar tail.

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 end hooks as shown.

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

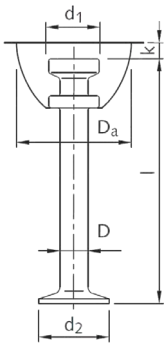


The angled pull reinforcement has to be placed as close as possible under the recess former and has to be installed with full contact to the anchor.

Load Capacity and Reinforcement of Spherical Head Eye Anchor

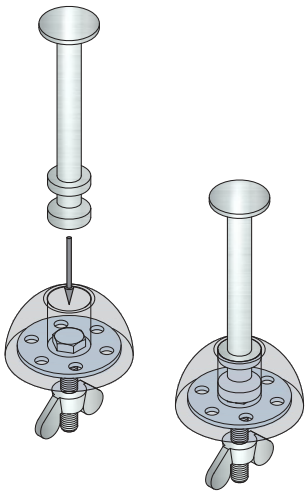
Load group [t]	Element thickness 2×e_r [mm]	Distance between anchors e_z [mm]	Square mesh reinforcement both-sides mm²/m	Reinforcement tail				Load capacity (kN) for	
				d_{s3} [mm]	Concrete strength			Axial pull up to 30° [β]	Angled pull up to 45° [β]
					15 N/mm²	25 N/mm²	35 N/mm²	at concrete strength	
					l_{s3} [mm]			15N/mm²	15N/mm²
1.3	80	500	188	10	650	510	420	13.0	10.2
2.5	80	600	188	12	1000	800	650	25.0	20.0
5.0	100	750	188	16	1700	1350	1100	50.0	40.0
10.0	140	1200	188	20	2000	1600	1300	100.0	80.0
20.0	180	1500	188	32	3000	2400	1950	200.0	160.0

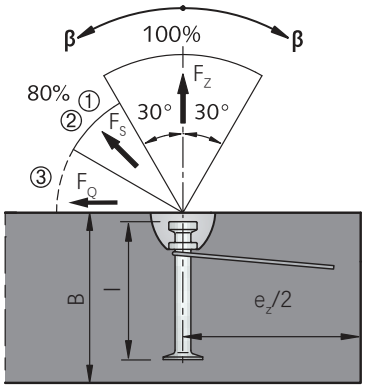
Spherical Double Headed Lifting Anchor



Spherical Double Headed Lifting Anchor				
MATERIAL	20Mn2 / Q345D / CM490 / Stainless Steel / Customizable			
SURFACE TREATMENT	Raw Black / Electro-galvanized / Hot-dip Galvanized			
SAFETY FACTOR	≥ 3			
CERTIFICATE	ISO9001 / CE			
SWL (tons)	CODE	LENGTH (mm)	D (mm)	WEIGHT (kg/pc)
1.3	HM-D-013055	55	10	0.06
	HM-D-013065	65	10	0.07
	HM-D-013085	85	10	0.08
	HM-D-013120	120	10	0.10
	HM-D-013240	240	10	0.17
2.5	HM-D-025055	55	14	0.14
	HM-D-025065	65	14	0.15
	HM-D-025075	75	14	0.16
	HM-D-025085	85	14	0.17
	HM-D-025110	110	14	0.21
	HM-D-025120	120	14	0.22
	HM-D-025140	140	14	0.24
	HM-D-025170	170	14	0.27
	HM-D-025240	240	14	0.35
5.0	HM-D-050055	55	20	0.32
	HM-D-050075	75	20	0.36
	HM-D-050085	85	20	0.39
	HM-D-050120	120	20	0.47
	HM-D-050180	180	20	0.61
	HM-D-050240	240	20	0.76

Double Head Lifting Anchor Instructions and Diagrams





The load capacity of double-head lifting anchors is the same as spherical head anchors, and the anchor suits the same lifting clutch. But the recess formers of double-head lifting anchors are difficult. Currently, commonly used recess formers are rubidium magnets.

The difference between Double Head Anchor and Spherical Head Anchor is a collar below the anchor head. This design makes it push into the recess former more quickly and can make a seal.

Assembly is faster, and the former remains on the mold when demolding. This is especially beneficial for negative castings like balconies or staircases.

1.Angled pull at β > 30° without reinforcement for the angled pull is only allowed at:

Concrete strength 15 N/mm² and wall thickness 3 times minimum thickness ez/2

Concrete strength 25 N/mm² and wall thickness 2.5 times minimum thickness ez/2

Concrete strength 35 N/mm² and wall thickness 2 times minimum hickness ez/2

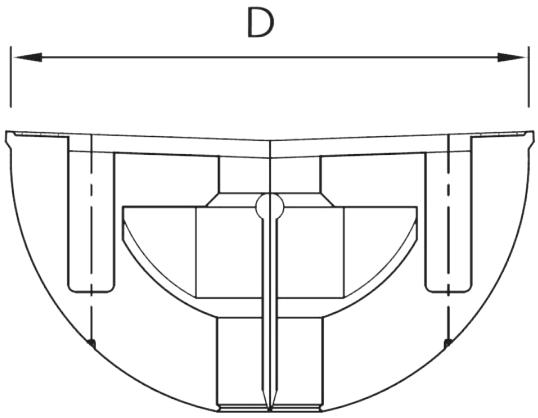
2.At a concrete strength > 23N/mm² FZ = FS.

3.Angled pull with β > 60° caused by the spread of cables/chains is not permitted

Load Capacity When Lifting Slabs With Any Direction of Pull

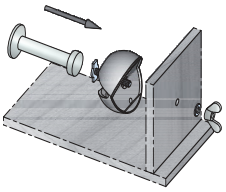
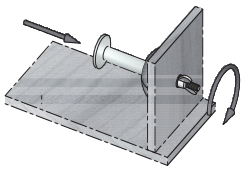
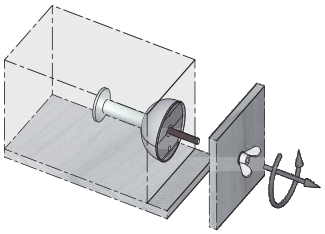
Load group [t]	Length of anchor l [mm]	Slab thickness B_{min} [mm]	Distance between anchors e_z [mm]	Load capacity (kN) for			
				Axial pull up to 30° [β]	Angled pull up to 45° [β]	Axial pull and Angled pull up to 45° [β] BSt 500 S	
				at concrete strength			
				15N/mm²	15N/mm²	25N/mm²	35N/mm²
1.3	65	100	⩾ 300	13	10.4	13	13
2.5	85	120	⩾ 380	19.5	15.6	25	25
5.0	110	150	⩾ 500	29.5	23. 6	38.1	45.1

Recess Former



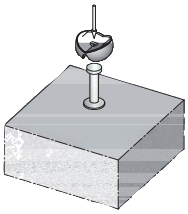
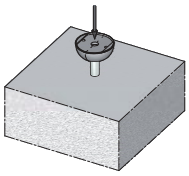
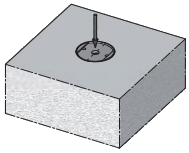
Recess Former			
MATERIAL	Rubber / Customizable		
SWL (tons)	CODE	DIAMETER (mm)	WEIGHT with Bolt (kg/pc)
1.3	HM-RRF-013	60	0.1
2.5	HM-RRF-025	74	0.2
5.0	HM-RRF-050	94	0.4
7.5	HM-RRF-075	118	0.6
10	HM-RRF-100	118	0.6
15	HM-RRF-150	160	1.4
20	HM-RRF-200	160	1.5
32	HM-RRF-320	214	3.7

Installation of the Lifting Anchors using Rubber Recess Former

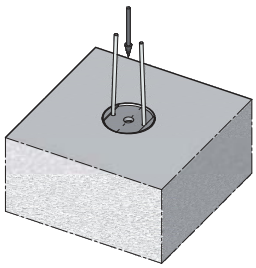
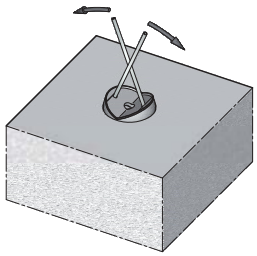
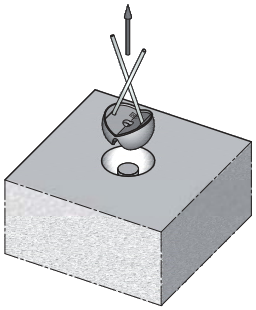
In most cases, the recess former is ordered with the preinstalled locating plate. If not, the recess former is opened and the locating plate together with the head of the Anchor is inserted into the recess former. The recess former is then fixed to the formwork using a wing nut. Finally, the recess former is tightened to the formwork and simultaneously closed around the anchor head, holding it firmly in position.

Installation in Slabs

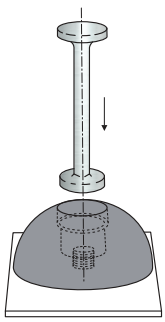
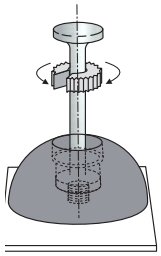
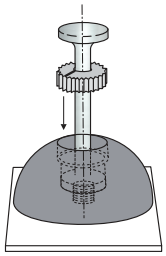
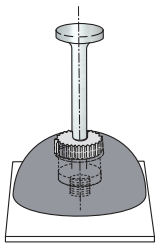
If the Spherical head lifting anchor is to be placed on top of an already poured concrete slab, for instance in a slab, one of the concrete wedges is removed, and the recess formers with the anchors are placed in the holes. At this stage, the concrete should be vibrated until the upper surface of the model is level with the concrete surface. It is important to ensure the board is in the recess former to maintain the anchors at the correct level.The anchors should be installed perpendicular to the formwork. Applying form oil, particularly inside the recess former, simplifies the disassembly process and positively impacts the lifespan of the recess former.

Removal of the Rubber Recess Former

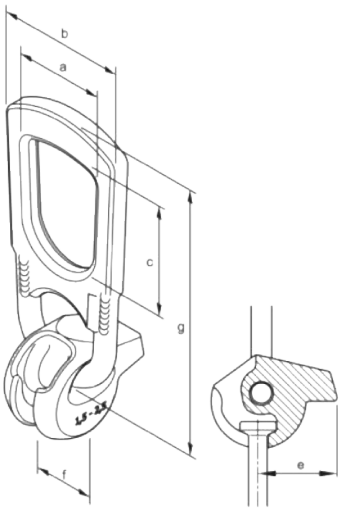
On the outside of the recess former, there are two holes to help lever the former out of the hardened concrete. Two reinforcement bars can be inserted in these holes and crossed against each other to open and remove the recess former. Excess concrete should be removed.

Spherical Head Anchor Installation in Magnet Recess Former.

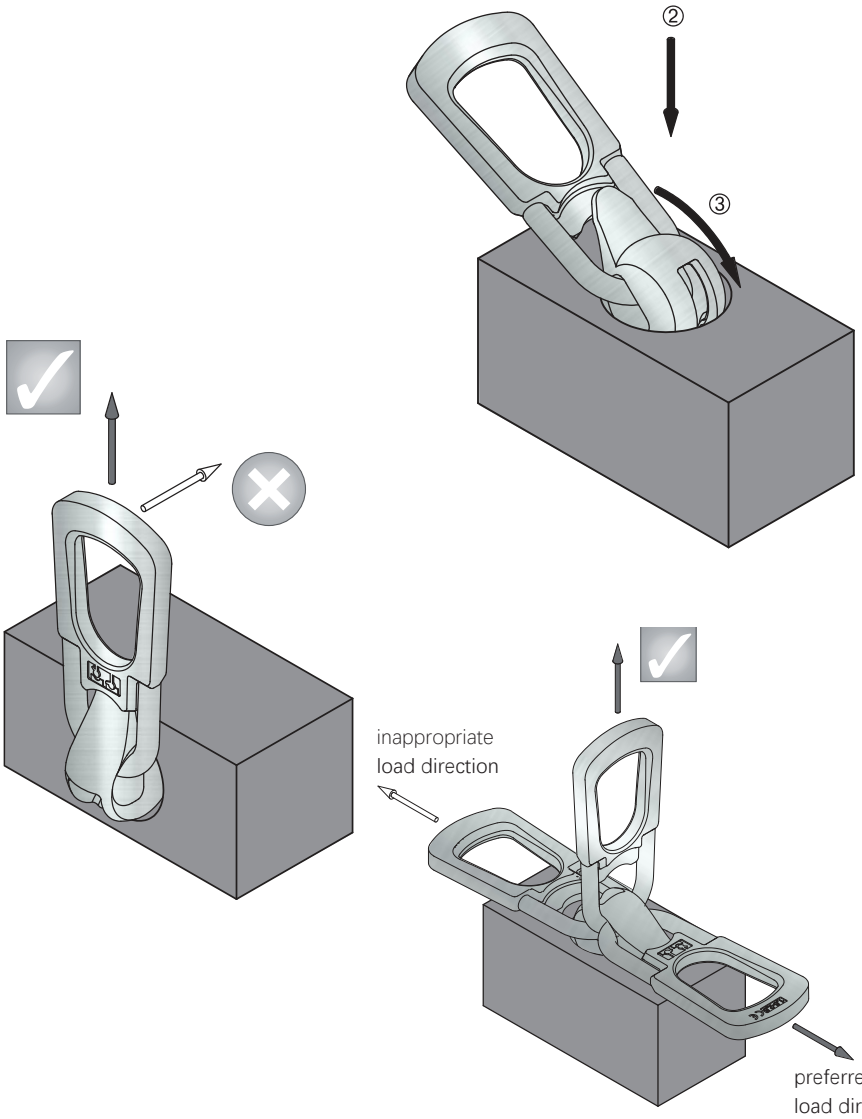
New design of recess former for rapid locating of the lifting anchors. The material is steel which helps to ensure long life in the casting yard. The high-performance rubidium magnet has better adsorption performance and can be used for a long time. The spherical head anchor can be used with a rubber grommet, while the double Head Anchor does not need a rubber grommet.

Lifting Clutch



Lifting Clutch			
MATERIAL	Q345D / Q355D / CM490 / G30CrMoV / Customizable		
SURFACE TREATMENT	Electro-galvanized		
SAFETY FACTOR	≥ 5		
CERTIFICATE	ISO9001 / CE		
SWL (tons)	**CODE**	**LENGTH (mm)**	**WEIGHT (kg/pc)**
1.3	HM-PC-013	165	1.0
2.5	HM-PC-025	205	1.7
5.0	HM-PC-050	240	3.6
10.0	HM-PC-100	346	9.8
20.0	HM-PC-200	520	24.5
32.0	HM-PC-320	590	45.0

Operating the Spherical Head Lifting Clutch



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.

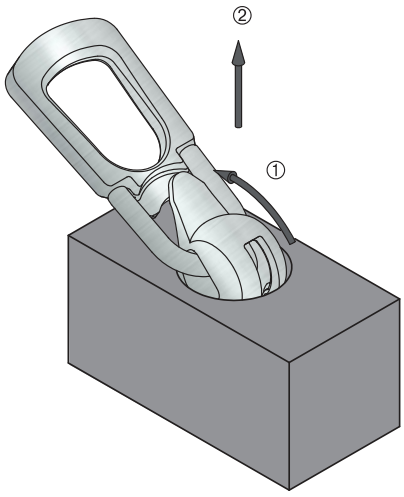
The Universal Head sits in the recess and is now ready for use.

Lifting:

The lifting clutch is suitable for axial loads and pitching. The unit can also be rotated on the lifting link when pitching the unit. The tongue must be closed during this process.

The counterweight of the tongue ensures that the sphere remains in the correct position, even when the load is released.

Turning the link while under load is restricted by friction. A small amount of grease is allowed if necessary.

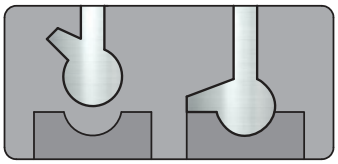


Release:

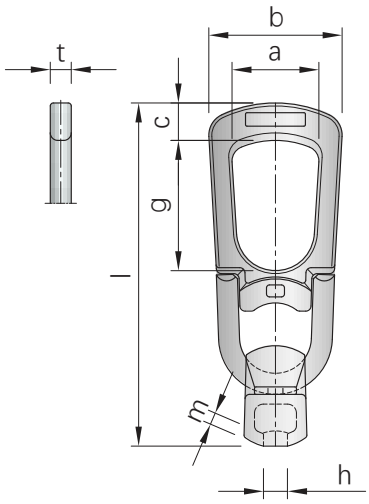
When the load is taken off, release the lifting clutch by turning the sphere with the tongue as shown.

Lift the lifting clutch well away, and do not let it dangle over the anchor.

Identification

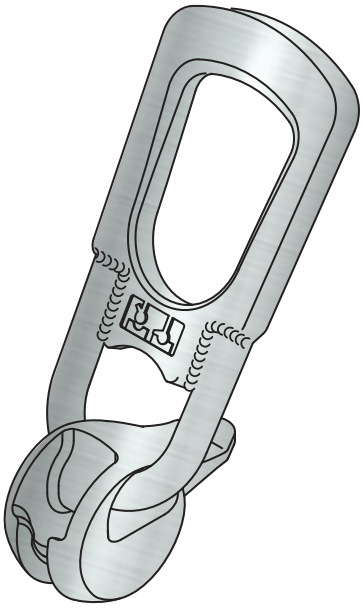


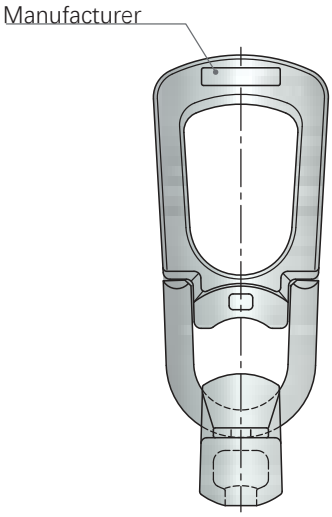
The Lifting Clutch is an attachment link for the lifting and transporting of precast concrete units in combination with the Spherical Head Anchor. The Lifting Clutch is manually operated and manufactured in the versions given in the following table.
The allowable loads for individual cases must be checked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

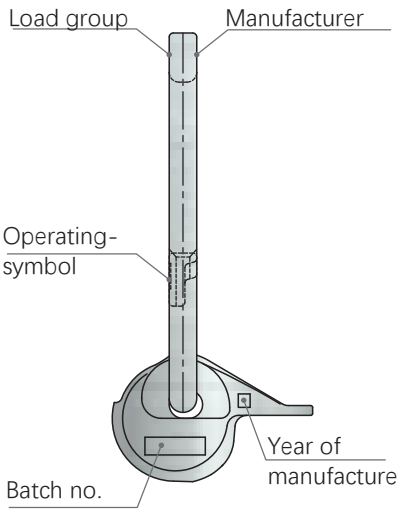


Safety regulations in the country of use must always be observed, in particular those for the use of cranes and lifting equipment.
Do not use the Lifting Clutch in precast units that have been designed for the turning and lifting clutch.

Spherical Head Lifting Clutch



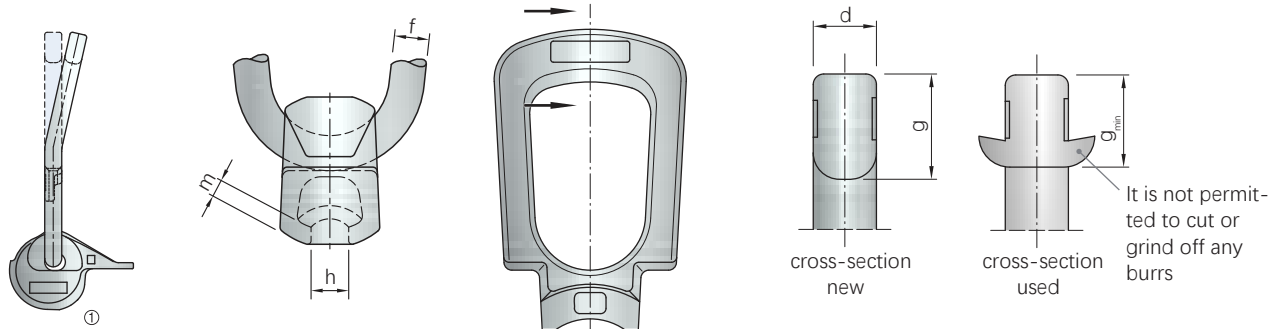




Each Lifting Clutch has identification markings as shown.
The front of the handle is stamped with the name of the manufacturer and the identification,
The rear of the handle shows the load group and an operating icon.

Inspection Procedure for Spherical Head Lifting Links

Limiting Dimensions for Spherical Head Lifting Clutch							
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	45
m_{max}	5.5	6	8	12	18	24	24
h_{min}	13	18	25	32	46	58	58
Minimum dimension for "g" and "f" [mm]							
g_{min}	14	17.5	28	36	56	80	85
f_{min}	11	13	19	27	37	40	48
If the clutch has been deformed by misuse, it must never be rebent. Reject if the clutch is clearly deformed.							



The customer must ensure that the lifting clutchs 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.

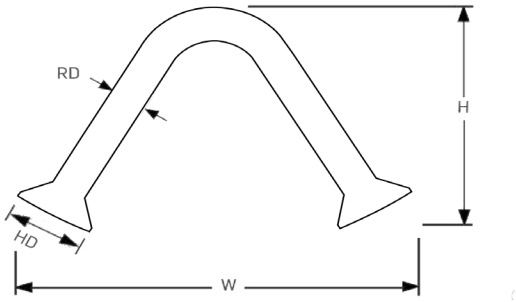
Reject the clutch if:

- 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.

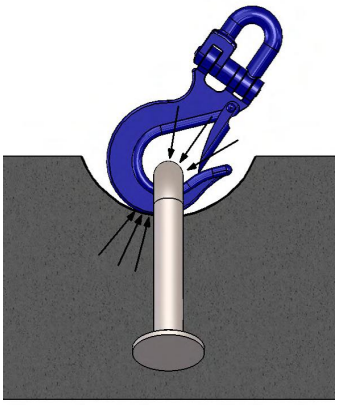
Inspections must be recorded in a report showing the values measured. Records must be filed and stored in an appropriate place. As a guide experience has shown that links last approx 7 years.

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

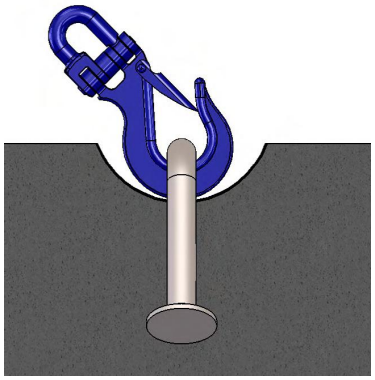
Utility Anchor



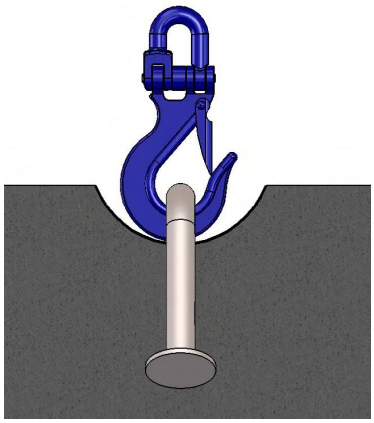
Utility Anchor					
MATERIAL	20Mn2 / Q345D / CM490 / Stainless Steel / Customizable				
SURFACE TREATMENT	Raw Black / Electro-galvanized / Hot-dip Galvanized				
SAFETY FACTOR	≥ 3				
CERTIFICATE	ISO9001 / CE				
SWL (tons)	CODE	H (mm)	W (mm)	RD (mm)	WEIGHT (kg/pc)
0.8	HM-U-008080	79.4	134.3	11.4	0.18
1.4	HM-U-014080	79.4	142.9	17	0.49
1.8	HM-U-018095	95.25	149.5	11.4	0.21
2.0	HM-U-020120	120.6	178.9	11.4	0.26
2.5	HM-U-025170	171.5	236.6	11.4	0.36
3.5	HM-U-035095	95.25	160.9	17	0.56
5.0	HM-U-050120	120.6	189.7	17	0.66
7.5	HM-U-075170	171.5	247	17	0.87



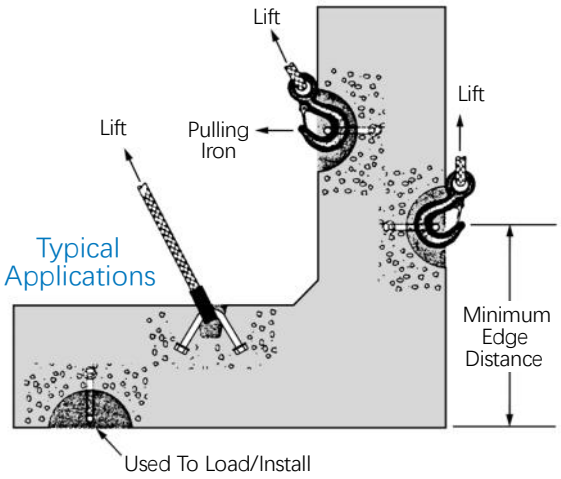
The hook must not contact the concrete beneath the anchor loop. This will result in a prying actionand could cause premature failure.



The hook must not contact the concrete element.



The hook must not contact the concrete element.

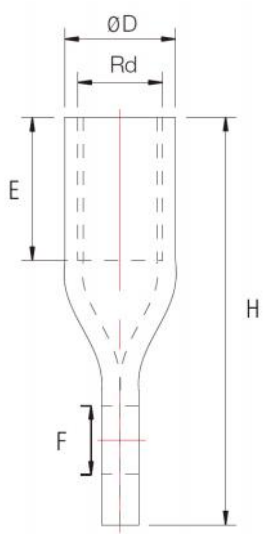


Placement of the Utility Anchor is dependent on the structural shape of the precast element. Utility anchors are not designed for thin edge installation. Always maintain minimum edge distances

Threaded Socket System

HULKMETAL

Flat End Lifting Socket



Flat End Lifting Socket						
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable					
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized					
SAFETY FACTOR	≥ 3					
CERTIFICATE	CE / ISO 9001					
SWL (tons)	CODE	THREAD (RD/M)	H(mm)	D(mm)	E(mm)	F(mm)
0.5	FELS-M/RD12-60	12	60	15	22	10
0.8	FELS-M/RD14-70	14	70	18	25	11
1.2	FELS-M/RD16-77	16	77	21	27	13
1.6	FELS-M/RD18-85	18	85	24	34	13
2.0	FELS-M/RD20-92	20	92	27	35	15.5
2.5	FELS-M/RD24-100	24	100	31	43	18

Flat-end lifting sockets are tapped, extruded, and punched from stainless steel or high-performance carbon steel.

Carbon steel Flat-end lifting sockets are surface treated for excellent rust resistance.

It Can pass the 3 times of safety factors tests.

Passed CE certification.

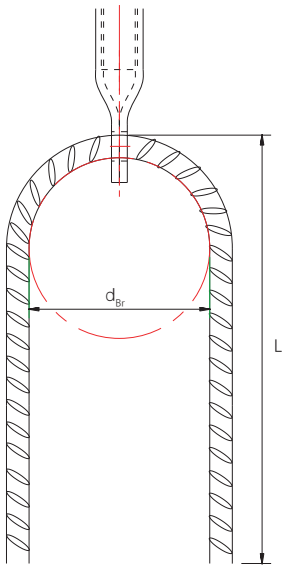
It has Rd and M threads to choose from.

Flat end lifting sockets are always used with reinforcement and their characteristics are shown in the table below:

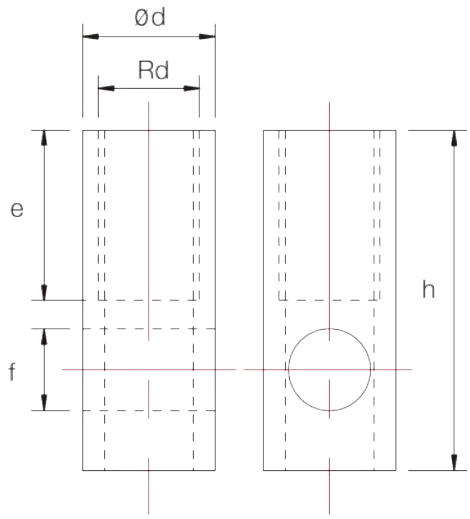
Diameter and Dimensions of Reinforcing Steels

Code	Armature [mm]	Ø d_{Br} [mm]	Formant	
			L [mm]	Cutting Length [mm]
FS-M/RD12-60	8	24	240	490
FS-M/RD14-70	8	32	280	570
FS-M/RD16-77	10	40	330	670
FS-M/RD18-85	10	40	420	850
FS-M/RD20-92	12	48	440	890
FS-M/RD24-100	14	56	480	970

The length of the reinforcements is defined for a minimum concrete strength of 15 MPa.



Tubular Lifting Socket

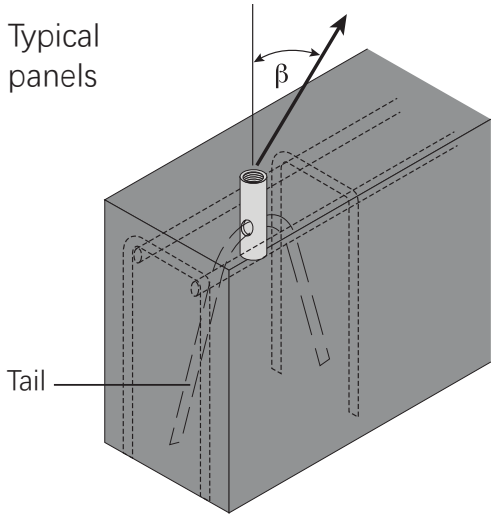


Tubular Lifting Socket						
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable					
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized					
SAFETY FACTOR	≥ 3					
CERTIFICATE	CE / ISO 9001					
SWL (tons)	**CODE**	**THREAD (RD/M)**	**h (mm)**	**d (mm)**	**e (mm)**	**f (mm)**
0.5	TS-M/RD12-40	12	40	15.0	22	8.0
0.8	TS-M/RD14-47	14	47	18.0	25	10.5
1.2	TS-M/RD16-55	16	55	21.0	27	13.0
1.6	TS-M/RD18-65	18	65	24.0	34	13.0
2.0	TS-M/RD20-69	20	69	27.2	35	15.5
2.5	TS-M/RD24-78	24	78	31.0	43	18.0
4.0	TS-M/RD30-105	30	105	39.5	56	22.5
6.3	TS-M/RD36-125	36	125	47.0	68	27.5
8.0	TS-M/RD42-145	42	145	54.0	80	32.0
12.5	TS-M/RD52-195	52	195	67.2	97	40.0

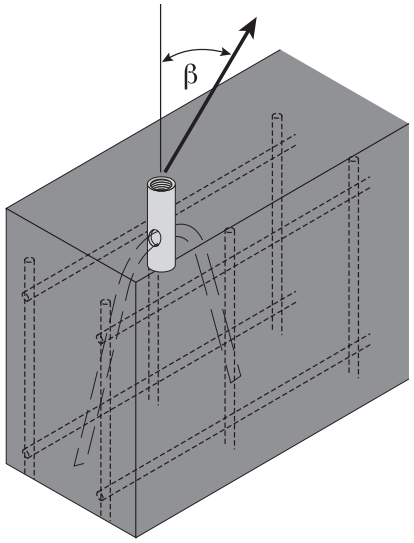
Tubular Lifting Sockets are economic and have advantages in thin components, where the long tail provides excellent anchorage. The reinforcement tail is essential and must be installed as shown in the picture by the precaster.
Tubular Lifting Sockets are available in stainless steel, Q345, Q235, and 20# steel. They have Rd and M threads to choose from. The sockets are specially made for lifting and are not to be confused with fixing sockets.

For thin units that have to be turned through 180° from mold to the final position, plain sockets can be made double-threaded to pass right through the unit.
Safe working loads shown are after the application of a safety factor on the test of 2 for 15 N/mm^2 concrete and 3 for steel. The actual working load must be calculated.

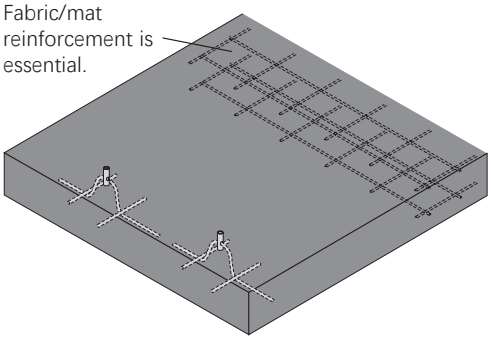
The details on these pages show panels, but they could equally apply to other components. The loads shown assume the angle of lift, i.e. β ⩽ 30° , and normal reinforcement such as a cage or two layers of mesh. Turning/pitching panels reduces the allowable load as shown below.



β ⩽ 12.5° Reinforcement cage Typically T12 bars full length T8 stirrups at 150 mm centres

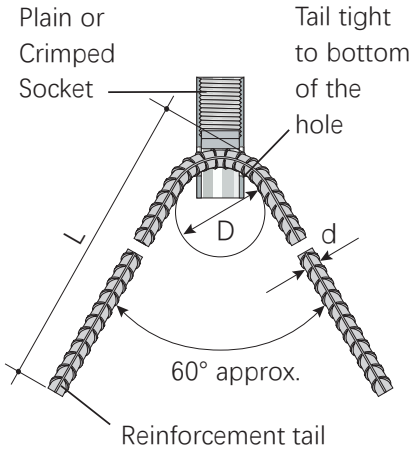


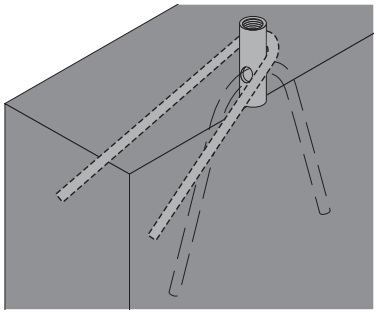
β ⩽ 12.5° Reinforcement cage Typically T12 bars full length T8 stirrups at 150 mm centers. Two layers of mesh Typically 8 mm wire.

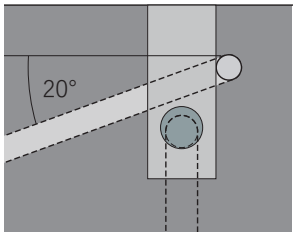


Reinforcement tails are typically U bars, but in slabs, the anchorage reinforcement may be cranked as depicted. It is important to avoid using completely straight bars. The bars should be laid over the cranked bars, as illustrated.
Minimum er assumes that the reinforcement cover is satisfactory to the designer: stainless steel might be necessary if the cover is restricted.

d mm	D mm	L mm	Unbent length mm
6	26	240	500
10	40	330	700
12	48	440	925
12	48	480	1000
16	64	650	1350
20	140	820	1700
25	175	860	1825
25	196	1200	2500







Lateral reinforcement for 12.5° < β < 45°

Insert. Dia	Reinforcement		
	dia.	Unbent Length	
12	6	400*	Allowable load as main table shown opposite
16	8	650*	
20	8	900*	
24	12	950*	
30	12	1200*	
36	16	1500*	
42	16	1700*	
52	20	2100*	

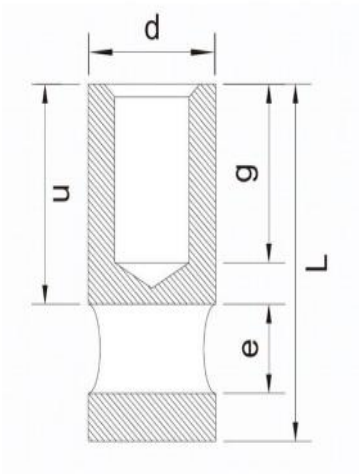
Turning/pitching reinforcement for slabs

Additional reinforcement is required where sockets are inserted in the edge for turning/ pitching.

Note:

Even with the additional reinforcement, the SWL is 50% of that shown in the table opposite.

Solid Rod Lifting Socket



Solid Rod Lifting Socket						
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable					
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized					
SAFETY FACTOR	≥ 3					
CERTIFICATE	CE / ISO 9001					
SWL (tons)	CODE	THREAD (RD/M)	L (mm)	d (mm)	g (mm)	e (mm)
0.5	SS-M/RD12-50	12	50	17	22	9.5
0.8	SS-M/RD14-54	14	54	19	26	11.5
1.2	SS-M/RD16-61	16	61	23	30	14.0
1.6	SS-M/RD18-70	18	70	24	34	14.5
2.0	SS-M/RD20-73	20	73	28	38	16.5
2.5	SS-M/RD24-86	24	86	32	46	19.0
4.0	SS-M/RD30-107	30	107	40	58	22.0
8.0	SS-M/RD42-145	42	145	54	80	32.0
12.5	SS-M/RD52-195	52	195	70	100	40.0

1.Solid Rod Lifting Socket is made of high-performance carbon steel rod and stainless steel rod after drilling, tapping, and surface treatment.

2.When it is used, it is necessary to use steel bars to pass through the cross holes to firmly fix it in the concrete unit.

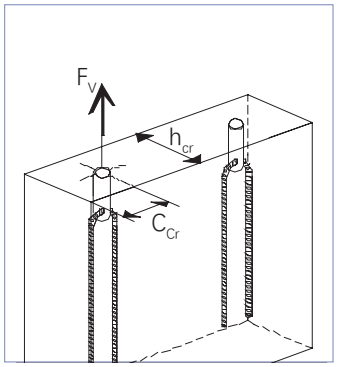
3.It can be used for lifting as well as fixing.

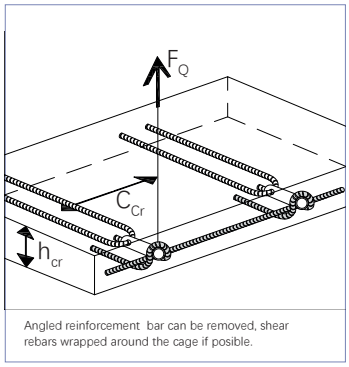
4.The carbon steel Solid Rod Lifting Socket also has excellent rust resistance after being galvanized.

5.It has passed CE certification.

In addition to the properties in the parameter table, we also support OEM services.

Fixing Design Capacities for Solid Rod Lifting Sockets:





These tables are for these sockets to be used as fixing points. They should be compared to the design loads on the socket.

These tables show a typical situation and you should check that your situation is within these parameters.

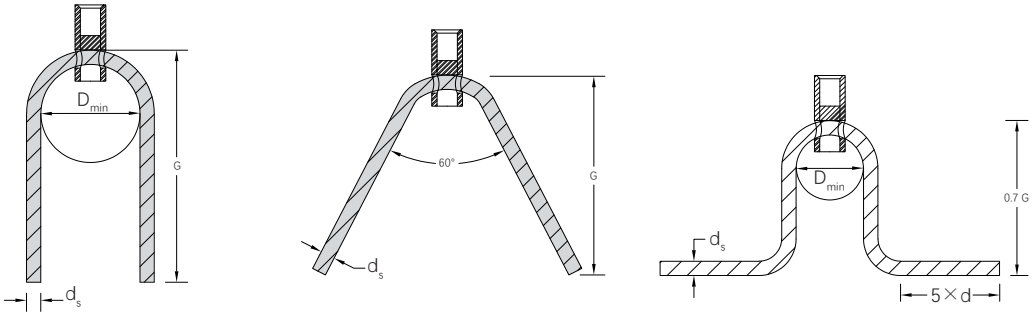
Where two or more sockets are in use, they should be spaced at a minimum of $2xC_{cr}$ apart.

Minimum reinforcement of two layers of 131mm^2/m mesh.Minimum concrete strength = 25N/mm^2

Part No.	Typical Installation Conditions		Axial Load	Shear Load
	Edge Distance C_{cr}	Element thickness h_{cr}	F_V	F_Q
	mm		kN	
SS-M/RD-10	140	80	10	4.6
SS-M/RD-12	140	80	15	6.6
SS-M/RD-16	180	100	22.5	10.0
SS-M/RD-20	250	120	45	19.5
SS-M/RD-24	300	120	50	20.8
SS-M/RD-30	350	160	65	33.5

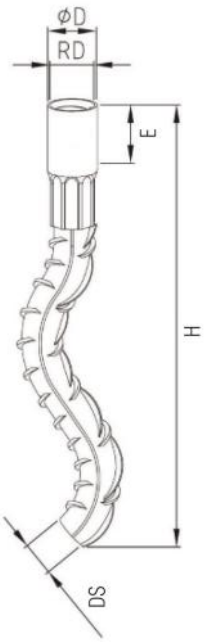
Solid rod lifting sockets must be used with anchorage reinforcement. Without this, they are ineffective and unsafe.

Anchorage Reinforcement For Solid Rod Lifting Sockets:



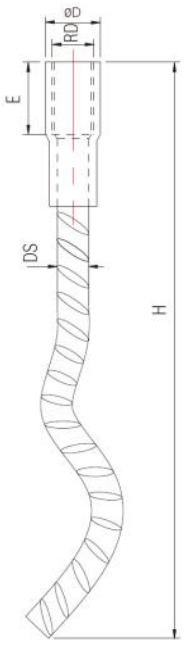
Reinforcement legs should be vertical as shown here, or may be angled up to 60° from the vertical depending on the application.

Short Wavy Lifting Socket



Short Wavy Lifting Socket						
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable					
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized					
SAFETY FACTOR	≥ 3					
CERTIFICATE	CE / ISO 9001					
SWL (tons)	CODE	THREAD (RD/M)	H (mm)	D (mm)	E (mm)	DS (mm)
0.5	SWS-M/RD12-105	12	105	15	22	8
1.2	SWS-M/RD16-165	16	165	21	27	12
2.0	SWS-M/RD20-195	20	195	27	35	14
2.5	SWS-M/RD24-240	24	240	31	43	16
4.0	SWS-M/RD30-300	30	300	40	56	20
6.3	SWS-M/RD36-380	36	380	47	68	25
8.0	SWS-M/RD42-450	42	450	54	80	28

Long Wavy Lifting Socket



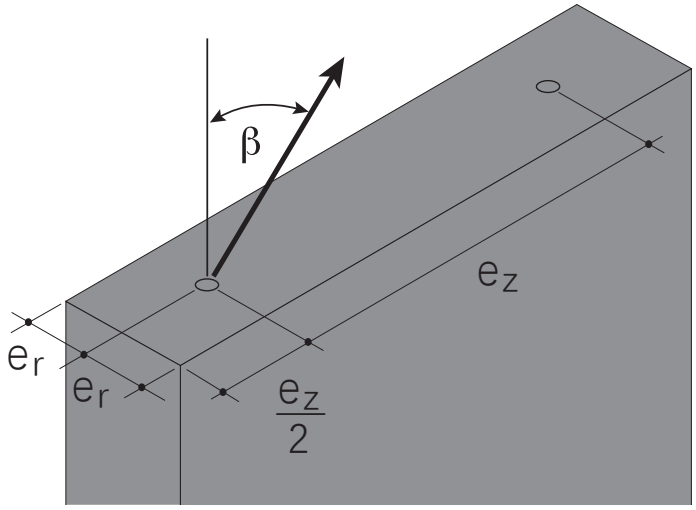
Long Wavy Lifting Socket						
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable					
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized					
SAFETY FACTOR	≥ 3					
CERTIFICATE	CE / ISO 9001					
SWL (tons)	CODE	THREAD (RD/M)	H (mm)	D (mm)	E (mm)	DS (mm)
0.5	LWS-M/RD12-137	12	137	15	22	8
1.2	LWS-M/RD16-216	16	216	21	27	12
2.0	LWS-M/RD20-257	20	257	27	35	14
2.5	LWS-M/RD24-360	24	360	31	43	16
4.0	LWS-M/RD30-450	30	450	40	56	20
6.3	LWS-M/RD36-570	36	570	47	68	25
8.0	LWS-M/RD42-620	42	620	54	80	28

Lifting Socket with Wavy is supplied pre-finished from the factory and comprises of a socket swaged to a wavy reinforcement bar. These sockets are the recommended choice as long as they meet the required length and edge distance for the specific job.

The optimal lifting method is depicted below, with a lifting angle of $\beta \leqslant 30°$.

Materials: Stainless Steel / Q345 / Q235 / 20#

The safe working loads indicated are calculated after applying a safety factor of 2 for 15 N/mm^2 concrete and 3 for steel.



Size	Minimum er mm	Minimum ez mm	Normal reinf.
			main bar dia. mm
Rd12	37	300	10
Rd16	40	400	10
Rd20	50	550	12
Rd24	60	600	12
Rd30	70	650	16
Rd36	100	800	16
Rd42	120	1000	16
Rd52	138	1200	20

Minimum e_r assumes that the reinforcement cover is satisfactory to the designer: stainless steel might be necessary if the cover is restricted.

Lifting on site is usually the worst case due to higher crane factors and a worse angle of lift (β).

Yard, e.g. demould

$F = [G + (q \times A) \times f \times Z] / n$

Site – handling

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

i.e. factors f and Z are usually worse on site

F = load per insert when lifting

G = dead weight of unit

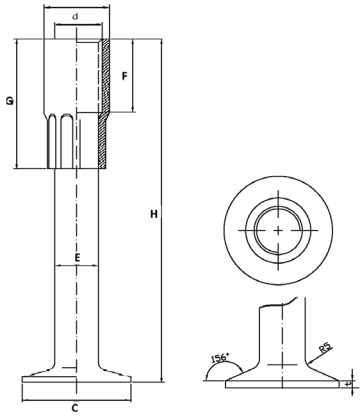
Q×A = adhesion to the mould

f = crane factor

Z = factor for angle β

n = number of inserts

Combi Lifting Socket

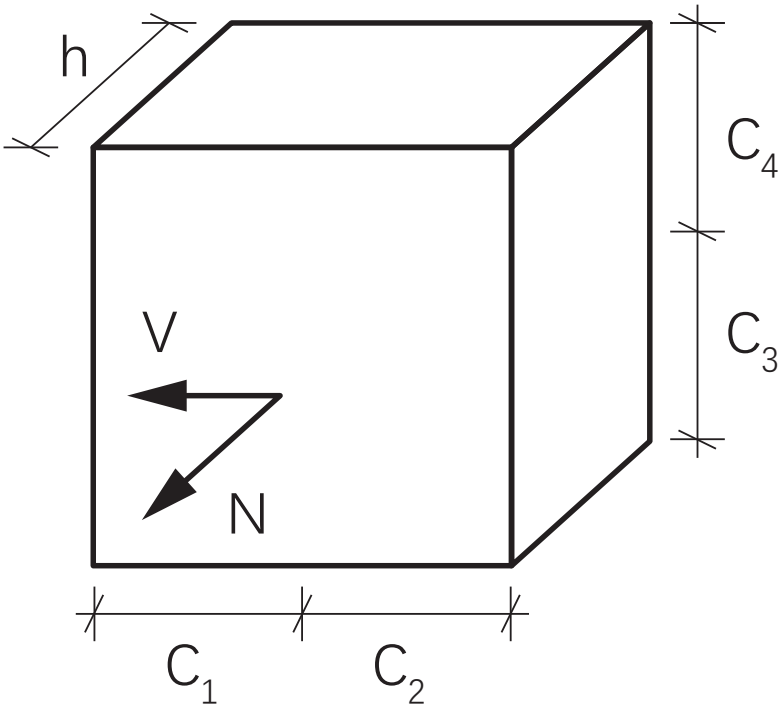


Combi Lifting Socket								
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable							
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized							
SAFETY FACTOR	≥ 3							
CERTIFICATE	CE / ISO 9001							
THREAD (M/Rd)	CODE	H (mm)	D (mm)	d (mm)	C (mm)	E (mm)	F (mm)	G (mm)
12	CLS-M/Rd12-057	57	17	12	25	10	22	45
	CLS-M/Rd12-070	70	17	12	25	10	22	45
	CLS-M/Rd12-100	100	17	12	25	10	22	45
16	CLS-M/Rd16-070	70	22	16	35	10	27	55
	CLS-M/Rd16-140	140	22	16	35	13	25	55
20	CLS-M/Rd20-090	90	27	20	45	16	34	67
	CLS-M/Rd20-180	180	27	20	45	16	34	68
	CLS-M/Rd20-240	240	27	20	45	16	34	68
	CLS-M/Rd20-360	360	27	20	45	16	34	68
24	CLS-M/Rd24-105	105	32	24	50	19	40	86
	CLS-M/Rd24-200	200	32	24	50	19	40	86
30	CLS-M/Rd30-270	270	39	30	60	22	49	103

Put the tapped sockets on the threaded steel bars or steel rods, and extrude the connection to make a Combi Lifting Socket. The material of the sleeve is Stainless Steel, Q345, Q235, 20#. The surface treatment methods include Row Color, electroplating, and hot-plating.

The safety factor is not less than 3 times. Certified as CE and ISO 9001.

There are two thread types of Combi Lifting Socket: RD and M. Other detailed parameters can refer to the table.

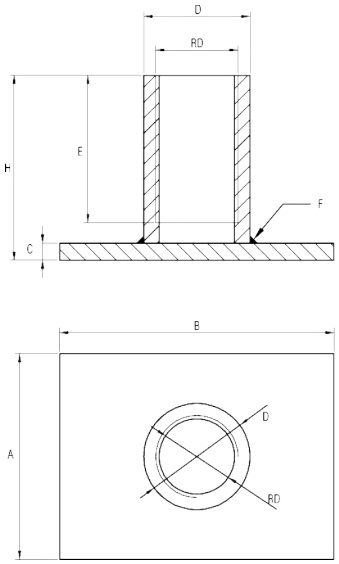


Design Loads Were Calculated Using:

- Cracked Concrete
- For shear loads: $C_3 = C_4 \geqslant 1.5\ C_1$
- For axial load: h ⩾ L + Cnom
- For shear loads: straight edge bar 2 ø x 12, stirrups ø12/ e=100
- Fixing bolt grade 8.8 for SL-P-ZN, grade A4-70 for SL-P-A4 ⩽ H24; A4-50 for H30.

Design resistances are valid for the associated edge distances and element thicknesses (center - center between two combi lifting sockets s > c). However, these are not minimum spacings. Resistances might increase or decrease depending on the fixing condition. By adding supplementary reinforcement resistance can be increased.

Flat Plate Lifting Socket



Flat Plate Lifting Socket								
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable							
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized							
SAFETY FACTOR	≥ 3							
CERTIFICATE	CE / ISO 9001							
SWL (tons)	CODE	THREAD (RD/M)	H (mm)	A (mm)	B (mm)	C (mm)	E (mm)	D (mm)
0.5	FPS-M/RD12-030	12	30	25	35	4	20	16
1.2	FPS-M/RD16-035	16	35	35	50	4	26	21.5
2.0	FPS-M/RD20-047	20	47	60	60	5	35	27
2.5	FPS-M/RD24-054	24	54	60	80	5	36	31
4.0	FPS-M/RD30-072	30	72	80	100	6	52	40
6.3	FPS-M/RD36-084	36	84	100	130	6	60	48
8.0	FPS-M/RD42-098	42	98	130	130	8	70	54
12.5	FPS-M/RD52-117	52	117	130	150	10	97	68

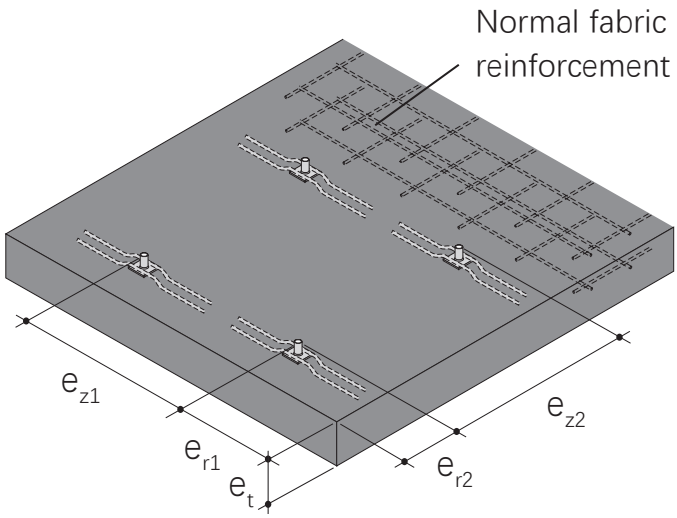
Plate Lifting Sockets are low profile (see **h** in the chart below) and hence are ideal for the face of thin panels or the top of slabs.

It is made of high-performance carbon steel and stainless steel pipes that are tapped and then welded with cut steel plates.

Carbon steel Plate Lifting Sockets have excellent rust resistance after being galvanized.

It has the performance of the safety factor over 3 times. The Plate Lifting Sockets we sell are CE-certified.

In addition to the Code in the parameter table, we also support OEM services.



Size	Min. e_{r1} mm	Min. e_{z1} mm	Min. e_{r2} mm	Min. e_{z2} mm	Min. e_t mm
Rd12	180	360	65	115	70
Rd16	250	500	75	140	85
Rd20	300	600	80	180	100
Rd24	400	800	95	215	115
Rd30	500	1000	120	275	140
Rd36	650	1300	145	330	160
Rd42	650	1300	165	375	175
Rd52	750	1500	190	435	215

Minimum e_{r1} and e_{r2} assumes socket is within the normal cage reinforcement. Cover to the reinforcement must be acceptable to the designer: in some cases stainless steel may be needed.

Lifting on site is usually the worst case due to higher crane factors and worse angle of lift (**β**).

Yard, e.g. demould

$F = [G + (q \times A) \times f \times Z] / n$

Site – handling

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

i.e. factors f and Z are usually worse on site

Summary calculations

F = load per insert when lifting

G = dead weight of unit

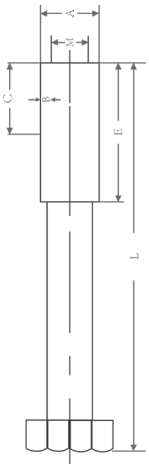
Q×A = adhesion to the mould

f = crane factor

Z = factor for angle β

n = number of inserts

Bolt Anchor Lifting Socket



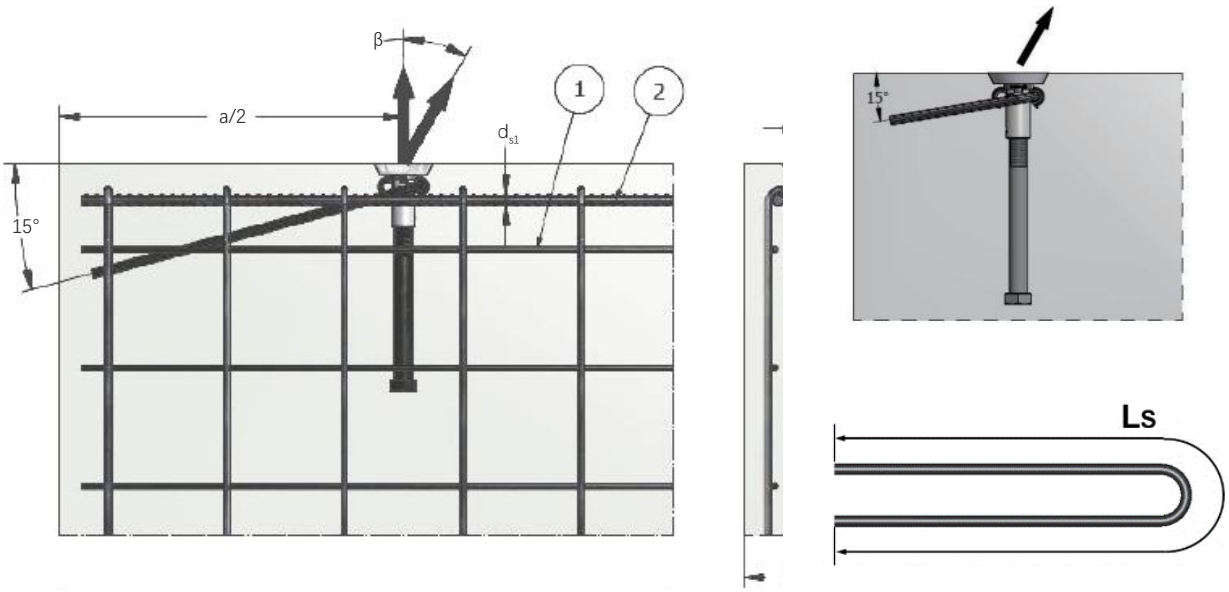
Bolt Anchor Lifting Socket

MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized
SAFETY FACTOR	≥ 3
CERTIFICATE	CE / ISO 9001

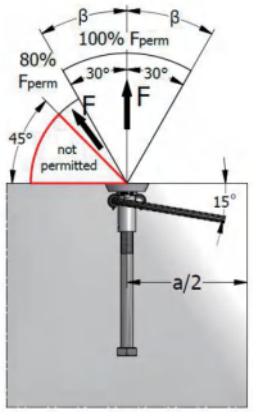
SWL (tons)	CODE	THREAD (M/Rd)	L (mm)	A (mm)	B (mm)	C (mm)	E (mm)
0.5	BS-M12-100	12	100	16	2.8	22	36
	BS-M12-150	12	150	16	2.8	22	36
1.2	BS-M16-140	16	140	22	3.9	30	48
	BS-M16-220	16	220	22	3.9	30	48
2.0	BS-M20-150	20	150	27	4.6	40	60
	BS-M20-180	20	180	27	4.6	40	60
	BS-M20-270	20	270	27	4.6	40	60
2.5	BS-M24-200	24	200	32	5.4	45	72
	BS-M24-320	24	320	32	5.4	45	72
4.0	BS-M30-240	30	240	40	6.6	60	90
	BS-M30-380	30	380	40	6.6	60	90

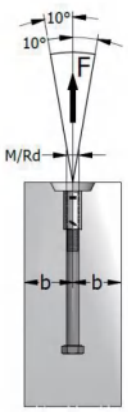
Bolt Anchors Lifting Sockets are made from a threaded bush locked on a standard bolt.
The Sockets are made of high-performance carbon steel and stainless steel and pass threading.
Before leaving the factory, it needs to pass a tensile test with a safety factor of more than 3 times.

Bolt Anchors Lifting Sockets are suitable for shallow embedded elements without the need for a reinforcement tail. The force transfer into the concrete is provided by the bolt head of the screw. For angled lifts, additional reinforcements are necessary. The lift angle must not exceed 30° . For turning/tilting a special tilting reinforcement must be used. In all cases, the standard mesh reinforcement must be present into the concrete element.
Bolt anchor lifting socket - Installation And Reinforcements Reinforcement And Load Capacity – Axial Load Up To 10° Reinforcement And Load Capacity – Diagonal Load Up To 45° .

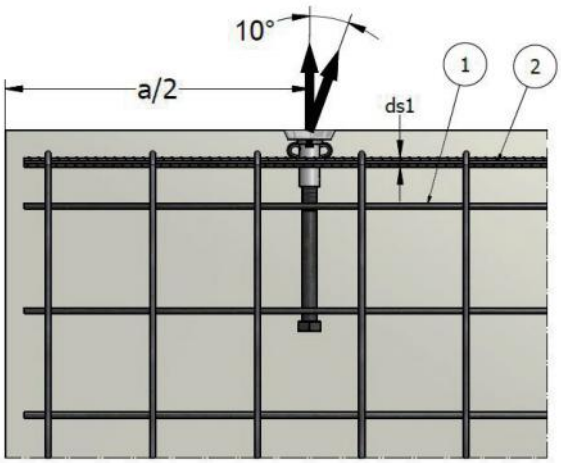


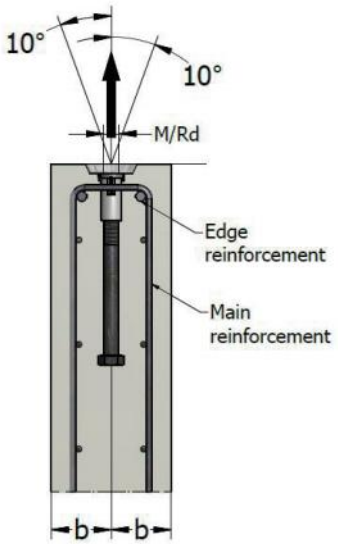
BS-M(Rd)	Load group [t]	Minimum unit thickness 2 x b [mm]	Axial spacing a [mm]	① .Mesh reinforce-ment [mm²/m]	② .Edge reinforce-ment d_{s1} [mm]	③ .Diagonal reinforcement Max.45° , β>30°		Load capacity for lifting loop application		Load capacity for lifting application
						ds [mm]	Ls [mm]	f_{cu}> 15N/mm²	f_{cu}>25N/mm²	f_{cu}>25N/mm²
								[kN]	[kN]	[kN]
M(Rd)12-100	0.5	60	300	1 x 188	Ø8	Ø6	320	4.0	5.0	5.0
M(Rd)16-140	1.2	80	400	2 x 131	2 x Ø8	Ø8	640	9.6	12.0	12.0
M(Rd)20-180	2.0	100	540	2 x 188	2 x Ø10	Ø10	840	16.0	20.0	20.0
M(Rd)24-200	2.5	100	600	2 x 188	2 x Ø10	Ø10	1050	20.0	25.0	25.0
M(Rd)30-240	4.0	120	720	2 x 188	2 x Ø12	Ø12	1260	32.0	40.0	40.0
M(Rd)36-300	6.3	160	900	2 x 188	2 x Ø12	Ø16	1600	44.6	63.0	63.0
M(Rd)42-460	8	200	1380	2 x 188	2 x Ø14	Ø20	2000	64	80	80





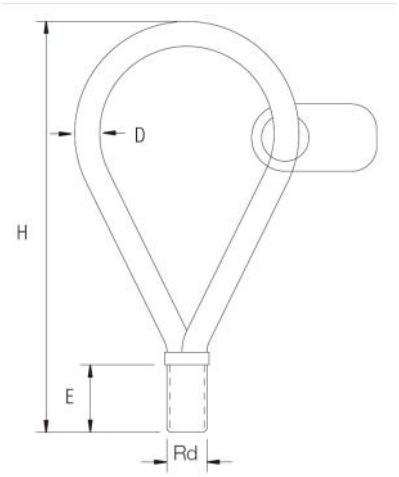
Note: The bending radius will be determined based on EN 1992. The diagonal reinforcement should be positioned in direct contact with the socket anchor. It is important to always install diagonal reinforcement on the opposite side of the load direction. The dimensions in the pictures are in [mm].





BS-M(Rd)	Load group [t]	Minimum unit thickness 2 x b [mm]	Axial spacing a [mm]	① .Mesh reinforcement [mm²/m]	② .Edge reinforcement d_{s1} [mm]	Load capacity	
						fcu> 15N/mm²	fcu>25N/mm²
						[kN]	[kN]
M(Rd)12-100	0.5	60	300	1 x 188	Ø8	5	5
M(Rd)16-140	1.2	70	400	2 x 131	2 x Ø8	12	12
M(Rd)20-180	2	80	540	2 x 188	2 x Ø10	16.9	20
M(Rd)24-200	2.5	100	600	2 x 188	2 x Ø12	25	25
M(Rd)30-240	4	120	720	2 x 188	2 x Ø12	40	40
M(Rd)36-300	6.3	140	900	2 x 188	2 x Ø12	55.7	63
M(Rd)42-460	8	180	1380	2 x 188	2 x Ø14	77	80

Lifting Loop



Lifting Loop					
MATERIAL	Alloy Steel / Carbon Steel / Customizable				
SURFACE TREATMENT	Electro-galvanized				
SAFETY FACTOR	≥ 5				
CERTIFICATE	CE / ISO 9001				
SWL (tons)	CODE	THREAD (RD/M)	H (mm)	E (mm)	D (mm)
0.5	LL-RD/M12-155	12	155	20	6
1.2	LL-RD/M16-165	16	165	27	8
2.0	LL-RD/M20-215	20	215	40	10
2.5	LL-RD/M24-255	24	255	42	12
4.0	LL-RD/M30-300	30	300	57	16
6.3	LL-RD/M36-360	36	360	63	18
8.0	LL-RD/M42-425	42	425	73	20
12.5	LL-RD/M52-530	52	530	90	26

It is the most economical Lifting Loop.

It has a performance with 5 times safety factor.

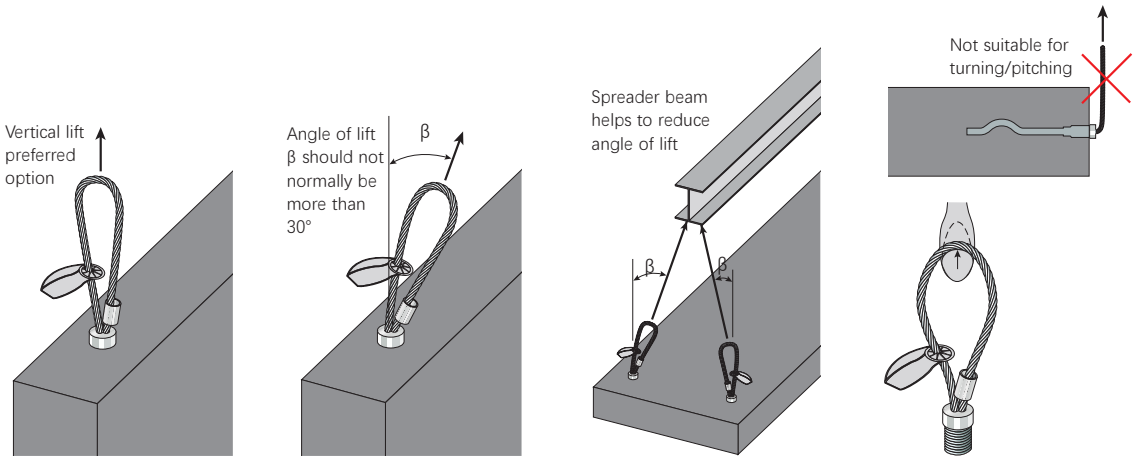
It has passed CE certification. And it is produced in an ISO 9001-certified factory.

It is suitable for almost all lifting sockets with the same thread.

They are not suitable for turning/pitching.

They may be reused subject to the inspection procedure, detailed below, but they are not recommended for severe re-use conditions.

Lifting loops should only be attached to the unit after the concrete strength has reached 15 N/mm2. In some cases, it may be economical and practical to leave the loops with the unit until final installation.



Testing/identification

All devices are proof loaded before dispatch and labeled with a unique Batch No. This number is recorded in the QA department at HULK Metal. If loops are kept reused they must be inspected every six months and retested every year.

Method of use

Before use, check that the lifting loop is compatible with the socket/insert and labeled with the unique number. Check that the wires are in good condition. Discard if bent, crushed, kinked, or if there is any loosening of the outer layer.

Discard if corroded.

Check the angle of lift shown on the unit drawings and follow the procedure shown. Do not use Threaded Lifting loops for turning/ pitching a unit. If b exceeds 45° , please consult HULK Metal. Ensure that the thread is fully bottomed out in the socket before lifting. It is permissible to back off one turn to ensure that the wire is correctly aligned for lifting.

Description

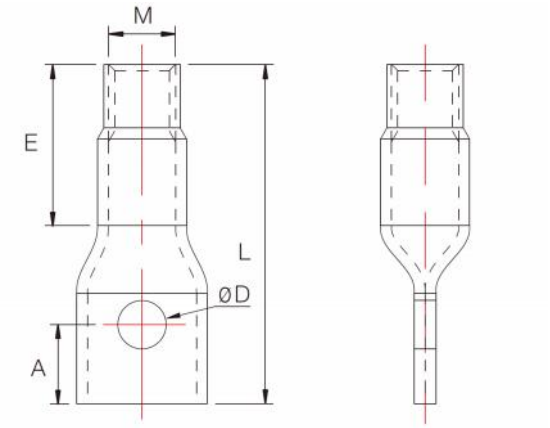
It is made by putting a high-performance steel pipe on a galvanized steel wire rope and extruding and turning thread.

It has Rd and M threads to choose from, which is compatible with both metric and Rd inserts.

It has the signs that clearly marked with their SWL.

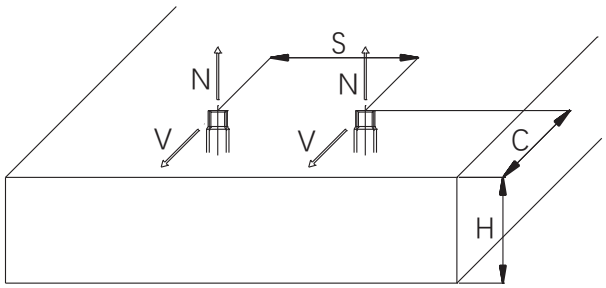
Lifting loops are suitable for use with inserts cast in flush with the face of the unit.

Flat End Fixing Socket



Flat End Fixing Socket					
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable				
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized				
SAFETY FACTOR	≥ 3				
CERTIFICATE	CE / ISO 9001				
SWL (tons)	CODE	THREAD (M)	L (mm)	D (mm)	E (mm)
0.12	FFS-M06-035	6	35	6.2	15
0.20	FFS-M08-040	8	40	8.2	15
0.35	FFS-M10-050	10	50	8.2	20
0.50	FFS-M12-060	12	60	10.2	25
0.70	FFS-M16-070	16	70	12.2	25
1.00	FFS-M16-100	16	100	12.2	45
1.25	FFS-M20-100	20	100	14.2	40
1.80	FFS-M24-120	24	120	14.2	50
2.75	FFS-M30-150	30	150	17.2	65

CODE	C_N [mm]	C_V [mm]	S [mm]	H [mm]
FFS-M06-035	55	70	105	80
FFS-M08-040	60	80	120	95
FFS-M10-050	75	100	150	85
FFS-M12-060	90	120	180	125
FFS-M16-070	105	140	210	95
FFS-M16-100	150	200	300	130
FFS-M20-100	150	200	300	125
FFS-M24-120	180	240	360	155
FFS-M30-150	225	300	450	175



Flat-end fixing sockets are not self-anchoring sockets and should be used with a maximum diameter FeE500 steel passing through the ØD hole. The total length of this steel must be at least 9 times its diameter. Flat-end Fixing Sockets are designed for fixing applications only and must not be used for lifting.

Working loads F are given for concrete with a minimum compressive strength of 25 MPa. To avoid any breakage of the concrete, it is necessary to respect distances to the minimum edges and center distances.

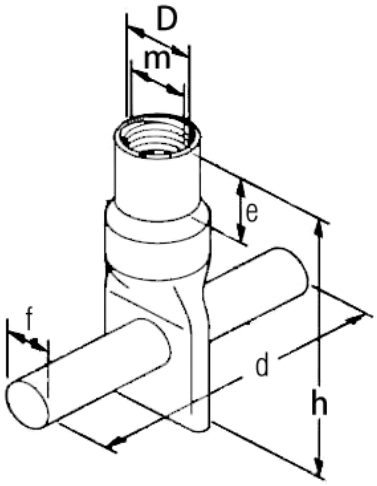
For tensile forces N, the minimum edge distance is C_N and the minimum center distance between two bushings is S. For shear forces V, the minimum edge distance is C_V and the minimum center distance between two bushes is S. The minimum thickness of the panel must be H, with a minimum concrete cover of 25 mm.

When the force applied is the result of a tensile force N combined with a shear force V, the working load F must respect the following formula:

$$\sqrt{(V^2+N^2)} \leq \text{perm. F}$$

The fixing sleeves must be used with screws with metric pitch. These must be screwed on at least once the diameter without exceeding the E value.

Flat Fixing Socket with Cross Pin



Flat Fixing Socket with Cross Pin							
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable						
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized						
SAFETY FACTOR	≥ 3						
CERTIFICATE	CE / ISO 9001						
SWL (tons)	CODE	THREAD (M)	L (mm)	d (mm)	h (mm)	e (mm)	f (mm)
0.15	FFSB-M06-035	6	35	50	35	6	6
0.20	FFSB-M08-040	8	40	50	40	8	6
0.35	FFSB-M10-050	10	50	50	50	10	6
0.50	FFSB-M12-060	12	60	50	60	12	10
0.65	FFSB-M16-070	16	70	100	70	16	10
1.00	FFSB-M16-100	16	100	100	100	16	12
1.25	FFSB-M20-100	20	100	100	100	20	13
1.80	FFSB-M24-120	24	120	100	120	24	17
2.75	FFSB-M30-150	30	150	100	150	30	22

Flat-end Fixing Sockets with Cross Pin is based on Flat-end Fixing Sockets by stamping high-performance steel rods into the holes.

The carbon steel Flat-end Fixing Sockets with Cross Pin also has excellent rust resistance after being galvanized.

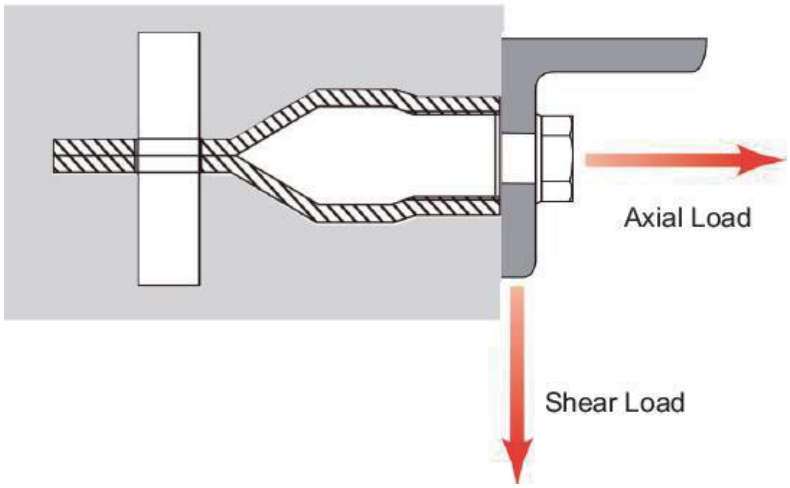
Before leaving the factory, it needs to pass the tensile test with a safety factor of more than 3 times.

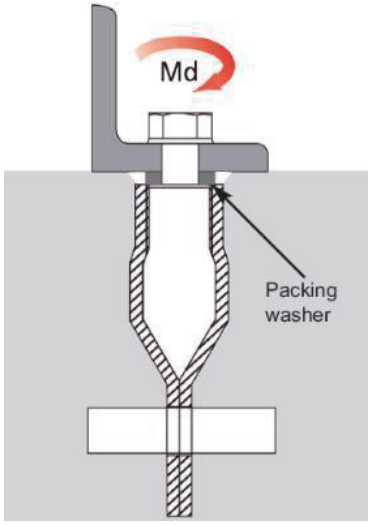
It has passed CE certification.

In addition to the properties in the parameter table, we also support OEM services.

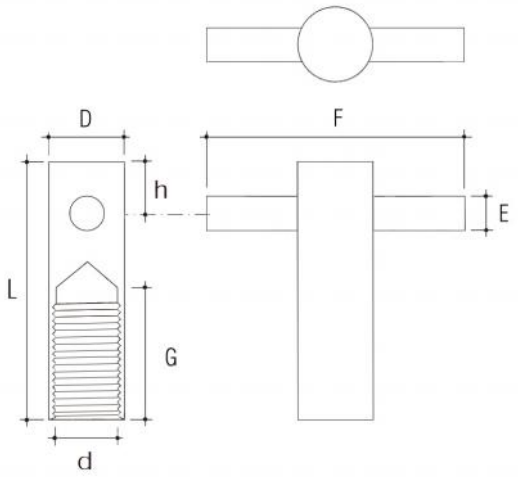
Flat-end Fixing Sockets with Cross Pin are designed for quick and easy connection of precast units with generous placement tolerances. These sockets should only be used where on-site fixing tolerances are sufficiently flexible. It incorporates a cross pin which alleviates the requirement of additional reinforcement, making it ideal for use in shallow elements.

Note: These sockets are not suitable for lifting operations.





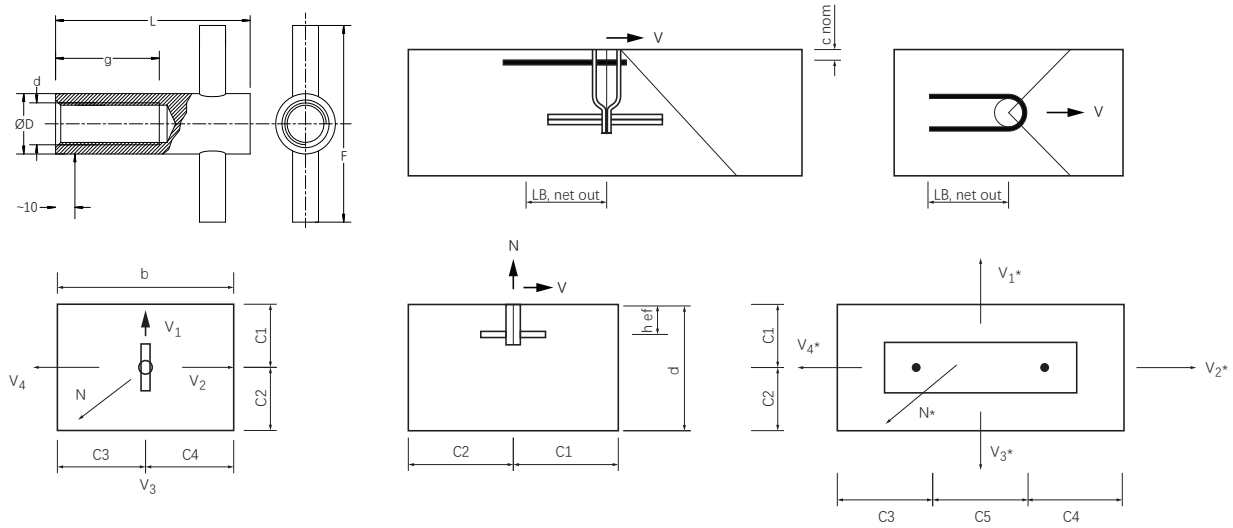
Solid Rod Fixing Socket with Cross Pin



Solid Rod Fixing Socket with Cross Pin							
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable						
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized						
SAFETY FACTOR	≥ 3						
CERTIFICATE	CE / ISO 9001						
SWL (tons)	CODE	THREAD (M)	L (mm)	D (mm)	G (mm)	E (mm)	F (mm)
0.6	FFSB-M10-050	10	50	16	25	6/8	50
0.9	FFSB-M12-050	12	50	18	20	10	75
0.9	FFSB-M12-075	12	75	18	40	10	75
1.7	FFSB-M16-075	16	75	23	40	10/12	75
2.3	FFSB-M20-075	20	75	28	35	12/14	90
3.0	FFSB-M24-100	24	100	32	55	16	100

Solid Rod Fixing Socket with Cross Pin is normally finished with a factory-fitted cross pin.
It only has M thread.
These sockets are specially designed for fixing, not suitable for lifting.
These are heavy-duty fixings machined from bar material.
Solid rod sockets are most commonly used as fixings in architectural precast units, where stainless steel is usually specified.

It can Pass CE Certification.
Solid Rod Fixing Socket with Cross Pin are the preferred option for high tensile and shear loads such as fixing cladding panels.
Allowable safe working loads are after applying a safety factor of approximately 2.5 on test data. Loads assume socket cast within the cage of reinforced concrete unit with a minimum strength of 30 N/mm.



$V2^{*} = V2$ $V4^{*} = V4$ → close edge is significant for failure

C1 = Edge distance towards the free edge where the shear force acts.
C2 = Edge distance in the direction away from the force.
C3 and C4 = Edge distances perpendicular to the shear force action.
Please note that the socket should be orientated with the pin parallel to the shear force action as shown here.

Size	er mm	ez mm
M10	75	150
M12	75	150
M12	75	150
M16	75	150
M20	75	150
M24	100	200
M30	125	250

Bars at the edge (<=100mm) wide reinforcement - (e>=100mm and ds<=10mm),

no extra rebars for axial load - insufficient edge distance

axial load and shear load at the same time; N_{rd} / N_{rd} + V_{rd} / V_{rd} <=1.2

V_{rd} * (2) = V_{rd} (2) and V_{rd} * (4) = V_{rd} * (4): for shear loads you only have to consider the fixing point close to the edge

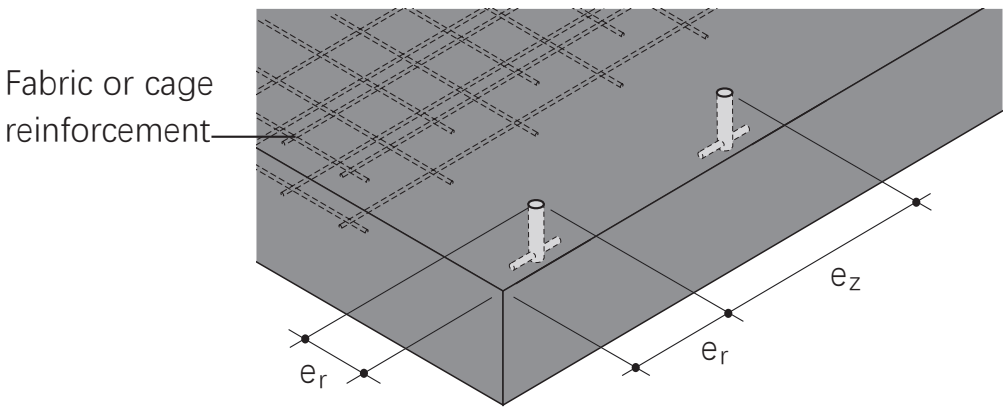
G - galvanised

S - stainless steel

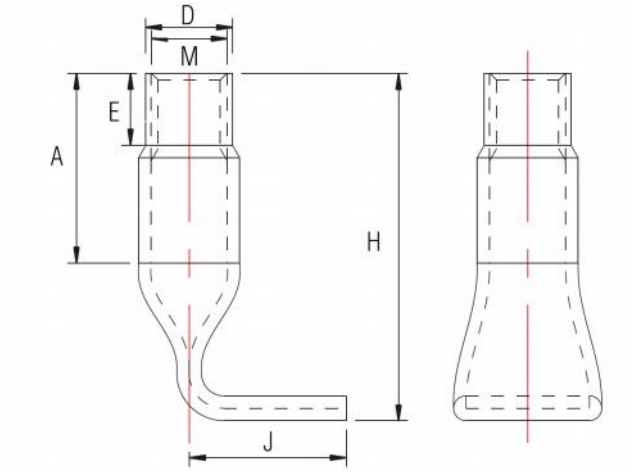
Where there is axial load and shear load at the same time, please ensure that each of the axial and shear components are less than the capacities and also that:

$$\frac{\text{Axial Component}}{\text{Axial Capacity}} + \frac{\text{Shear Component}}{\text{Shear Capacity}} \leqslant 1.2$$

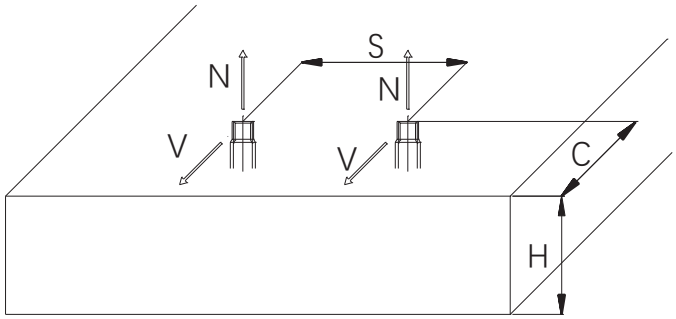
Where two or more sockets are in use, they should be spaced at a minimum of 2×C3 apart.



Fixing Socket with Bent End



Fixing Socket with Bent End							
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable						
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized						
SAFETY FACTOR	≥ 3						
CERTIFICATE	CE / ISO 9001						
SWL (tons)	CODE	THREAD (M)	H (mm)	J (mm)	D (mm)	A (mm)	E (mm)
0.20	FBS-M08-030	8	30	20	10.5	16	8
0.30	FBS-M10-060	10	60	25	13.5	23	10
0.40	FBS-M12-045	12	45	25	16	23	12
0.40	FBS-M12-070	12	70	30	16	23	12
0.30	FBS-M16-080	16	80	30	22	28	15
0.95	FBS-M16-100	16	100	35	22	28	15
1.25	FBS-M20-070	20	70	30	27	28	18
1.25	FBS-M20-100	20	100	35	27	25	18
1.45	FBS-M24-080	24	80	35	32	25	21



The 90° elbow fixing sockets are self-anchoring sockets.

These Fixing Sockets are designed for fixing applications only and must not be used for lifting.

Their material are carbon steel and stainless steel and the surface treatment are electroplating or raw color (stainless steel).

Working loads F are given for concrete with a minimum compressive strength of 25 MPa.

To avoid any breakage of the concrete, it is necessary to respect the distances to the edges and the minimum center distances.

For tensile forces N, the minimum edge distance is CN and the minimum center distance between two bushings is S. For shear forces V, the minimum edge distance is CV and the minimum center distance between two bushes is S. The minimum thickness of the panel must be H, with a minimum concrete cover of 25 mm.

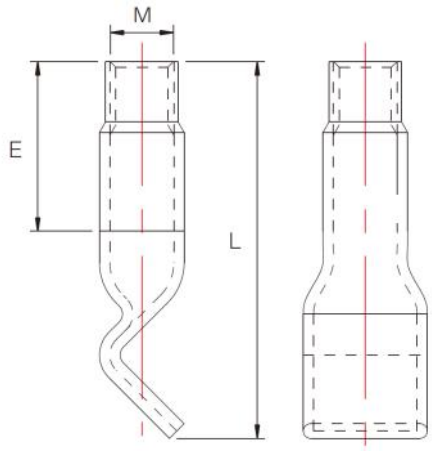
When the force applied is the result of a tensile force N combined with a shear force V, the working load F must respect the following formula:

$$\sqrt{(V^2+N^2)} \leq \text{perm. F}$$

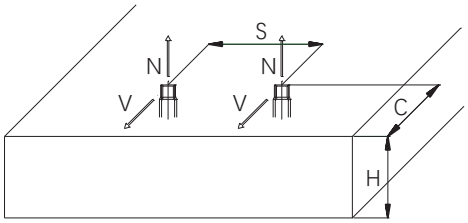
The fixing sleeves must be used with screws with metric pitch. These must be screwed on at least once the diameter without exceeding the E value.

CODE	C_N [mm]	C_V [mm]	S [mm]	H [mm]
FBS-M10-060	90	120	180	85
FBS-M12-045	70	90	135	70
FBS-M12-070	105	140	210	95
FBS-M16-060	90	120	180	85
FBS-M16-100	150	200	300	125
FBS-M20-070	105	140	210	95
FBS-M20-100	150	200	300	125

Fixing Socket With Wavy End



Fixing Socket With Wavy End				
MATERIAL	Stainless Steel / Q345 / Q235 / 20# / Customizable			
SURFACE TREATMENT	Raw Color, Electro-galvanized, Hot-dip Galvanized			
SAFETY FACTOR	≥ 3			
CERTIFICATE	CE / ISO 9001			
SWL (tons)	CODE	THREAD (M)	L (mm)	E (mm)
0.08	FWS-M06-030	6	30	10
0.15	FWS-M06-050	6	50	30
0.20	FWS-M08-040	8	40	15
0.25	FWS-M08-050	8	50	20
0.30	FWS-M10-040	10	40	15
0.35	FWS-M10-050	10	50	20
0.50	FWS-M12-060	12	60	25
1.00	FWS-M16-100	16	100	45
1.25	FWS-M20-100	20	100	65



The fixing sockets with wavy end are made by extruding, bending, shrinking, and other processes.
The wavy fixing sockets serve as self-anchoring sockets.
Fixing sockets should only be used for fixing applications and not for lifting purposes.
The working loads F provided apply to concrete with a minimum compressive strength of 25 MPa.
It will go through a tensile test with a safety factor of more than 3 times before leaving the factory.
To prevent any concrete breakage, it is important to adhere to the specified distances from the edges and the minimum center distances.
For tensile forces N, the minimum distance from the edge is CN, and the minimum center distance between two sockets is S.
For shear forces V, the minimum distance from the edge is CV, and the minimum center distance between two sockets is also S.
The panel must have a minimum thickness of H and a minimum concrete cover of 25 mm.

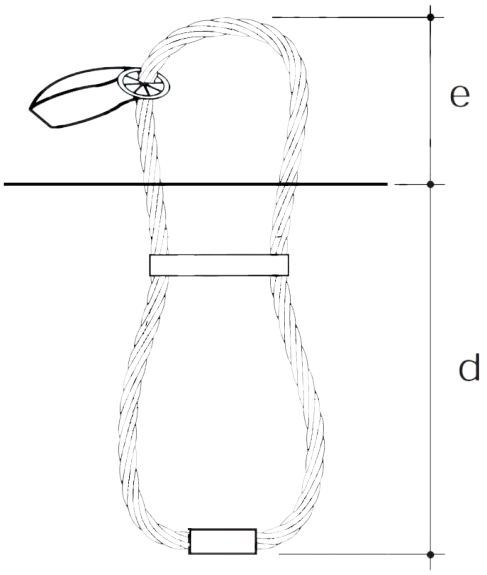
When the applied force is a combination of tensile force N and shear force V, the working load F must comply with the following formula:

$$\sqrt{(V^2+N^2)} \leq \text{perm. } F$$

The fixing sockets must be used with screws with metric pitch. These must be screwed on at least once the diameter without exceeding the E value.

CODE	C_N [mm]	C_V [mm]	S [mm]	H [mm]
FWS-M06-030	45	60	90	55
FWS-M06-050	75	100	150	75
FWS-M08-040	60	80	120	65
FWS-M08-050	75	100	150	75
FWS-M10-040	60	80	120	65
FWS-M10-050	75	100	150	75
FWS-M12-060	90	120	180	85
FWS-M16-100	150	200	300	125
FWS-M20-100	150	200	300	125

Cast in Loop



Cast in Loop				
MATERIAL	Alloy Steel / Carbon Steel / Aluminum Alloy / Customizable			
SURFACE TREATMENT	Electro-galvanized			
SAFETY FACTOR	≥ 3			
CERTIFICATE	CE / ISO 9001			
SWL (tons)	CODE	E (mm)	D (mm)	Rd (mm)
0.8	HM-CL008	60	150	6
1.2	HM-CL012	65	160	7
1.6	HM-CL016	70	165	8
2.0	HM-CL020	80	200	9
2.5	HM-CL025	85	230	10
4.0	HM-CL040	100	240	12
5.2	HM-CL052	100	260	14
6.3	HM-CL063	110	280	16

SWL (tons)	CODE	E (mm)	D (mm)	Rd (mm)
8.0	HM-CL080	120	320	18
10.0	HM-CL100	135	390	20
12.5	HM-CL125	150	420	22
16.0	HM-CL160	165	450	24
20.0	HM-CL200	180	550	28
25.0	HM-CL250	200	600	32

Introduction:

Cast-in lifting loops are the most cost-effective way to attach a crane hook to precast units. However, they do require significant edge distances. Additionally, it is important to consider the visibility of steel rope hoops after panel assembly. If necessary, protruding hoops can be cut off, but it is still important to protect the cut ends from corrosion to prevent rust staining.

Using cast-in lifting loops is the safest method due to its flexibility. Hoops made from reinforcement bars are more prone to fatigue, especially if they are bent during angled lifts.

In reinforced concrete, if the hoops are installed according to the minimum dimensions in the table, no additional anchorage reinforcement is usually needed. However, for acute-angled lifts, it may be necessary to provide additional lateral reinforcement.

Description:

Cast-in lifting hoops are manufactured from bright or galvanized mild steel rope. They have a swaged connecting ferrule and a tag that clearly identifies the SWL of the loop. The tag is designed not to slide down the hoop during casting and should therefore remain visible.

Cast-in lifting loops are suitable for use through a single cycle from production to final installation but are not suitable for multi-use applications.

Selection:

Ensure the correct size is chosen for any lift. Consider the lift angle, crane factor, and adhesion to the formwork.

Installation:

Install loops in the direction of the anticipated load, with the ferrule directly opposite the pulling direction. Suspend them from supports attached to the formwork, allowing 2/3 of the hoop to be embedded and 1/3 exposed.

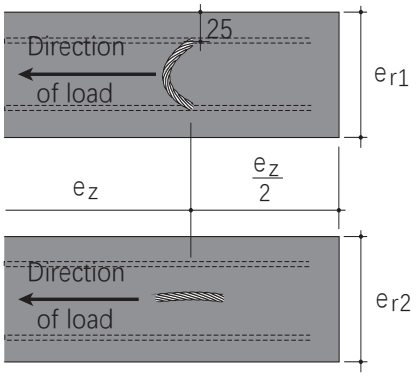
Secure the hoop to the cage carefully to prevent movement during concreting. Fasten it through the shuttering, ensuring the wire is tightly sealed to the shuttering.

Storage:

When storing concrete units, take precautions to prevent steel rope hoops from bending. Inspect the hoops for damage as described in the Method of Use section below.

Crane Linkage:

Exposed hoops can be connected to standard crane hooks, provided that the curvature radius of the crane hook is at least equal to the rope diameter.



Reinforcement cage essential

Method of Use:

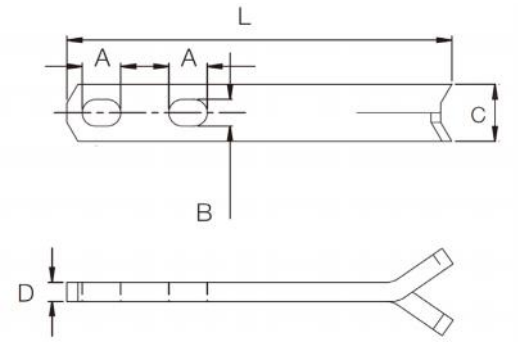
Before casting or lifting, ensure that the hoop is in good condition. Discard a hoop if any wires are broken, crushed, unraveled, or if there are kinks. Additionally, do not use it if excessive corrosion is present. Any cast-in hoop displaying damage should not be utilized.

SWL [t]	Minimum Spacings			Color Code
	e_z [mm]	e_{r1} [mm]	e_{r2} [mm]	
0.8	540	140	80	White
1.2	620	150	100	Red
1.6	690	170	120	Purple
2.0	830	180	140	Light green
2.5	890	190	160	Charcoal
4.0	1000	220	200	Dark green
5.2	1030	300	240	Orange
6.3	1150	320	280	Blue
8.0	1290	410	300	Light grey
10.0	1460	440	320	Pink
12.5	1620	570	360	Yellow
16.0	1860	630	420	Lilac
20.0	2120	680	450	Ochre
25.0	2410	760	500	Brown

Spread Anchor System

HULKMETAL

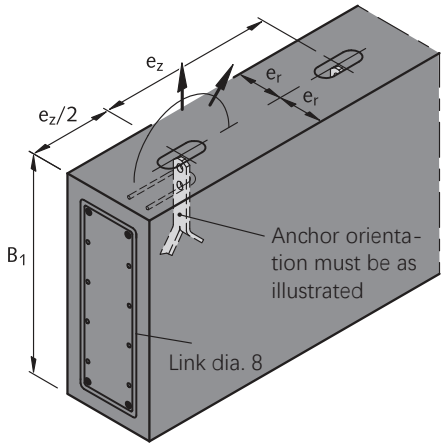
Two Hole Spread Anchor



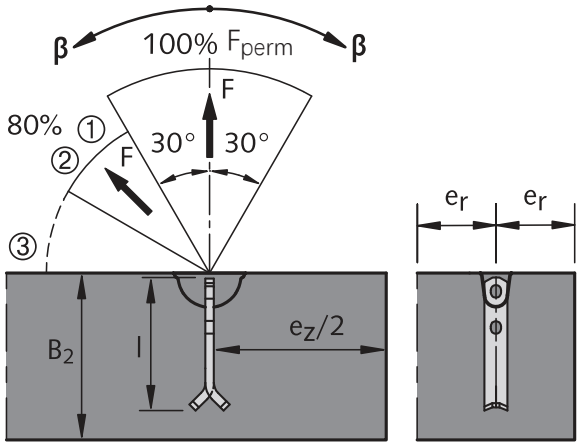
Two Hole Spread Anchor							
MATERIAL	20Mn2 / Q345D / CM490 / Stainless Steel / Customizable						
SURFACE TREATMENT	Raw Color / Electro-galvanized / Hot-dip Galvanized						
SAFETY FACTOR	≥ 3						
CERTIFICATE	ISO9001 / CE						
Load Group (tons)	**CODE**	**SWL (tons)**	**LENGTH (mm)**	**A (mm)**	**B (mm)**	**C (mm)**	**D (mm)**
2.5	DSA007-05-110	0.7	110	20	14	30	5
	DSA014-06-110	1.4	110	20	14	30	6
	DSA014-06-160	1.4	160	20	14	30	6
	DSA020-08-130	2.0	130	20	14	30	8
	DSA020-08-160	2.0	160	20	14	30	8
	DSA020-08-210	2.0	210	20	14	30	8
	DSA025-10-150	2.5	150	20	14	30	10
	DSA025-10-200	2.5	200	20	14	30	10
	DSA025-10-250	2.5	250	20	14	30	10
5.0	DSA030-10-160	3.0	160	22	18	40	10
	DSA030-10-200	3.0	200	22	18	40	10
	DSA030-10-280	3.0	280	22	18	40	10
	DSA040-12-180	4.0	180	22	18	40	12
	DSA040-12-240	4.0	240	22	18	40	12
	DSA040-12-320	4.0	320	22	18	40	12
	DSA050-15-180	5.0	180	22	18	40	15
	DSA050-15-240	5.0	240	22	18	40	15
	DSA050-15-400	5.0	400	22	18	40	15

10.0	DSA053-12-260	5.3	260	31	26	60	12
	DSA053-12-300	5.3	300	31	26	60	12
	DSA053-12-340	5.3	340	31	26	60	12
	DSA075-16-260	7.5	260	31	26	60	16
	DSA075-16-300	7.5	300	31	26	60	16
	DSA075-16-420	7.5	420	31	26	60	16
	DSA100-20-300	10.0	300	31	26	60	20
	DSA100-20-370	10.0	370	31	26	60	20
	DSA100-20-520	10.0	520	31	26	60	20
26.0	DSA140-20-370	14	370	45	35	80	20
	DSA140-20-460	14	460	45	35	80	20
	DSA220-26-500	22	500	45	35	90	26
	DSA220-26-620	22	620	45	35	90	26

Without angled pull reinforcement



With angled pull reinforcement



The spread anchor is highly versatile, offering efficient anchorage in thin panels and slabs. In special cases, the spread anchor can be combined with additional reinforcement by utilizing the extra hole.

① Angled pull at 30° < β ⩽ 60° without angled pull reinforcement only permissible when:

$\beta_W \geqslant 15$ N/mm^2 + 3-fold min. thickness of unit

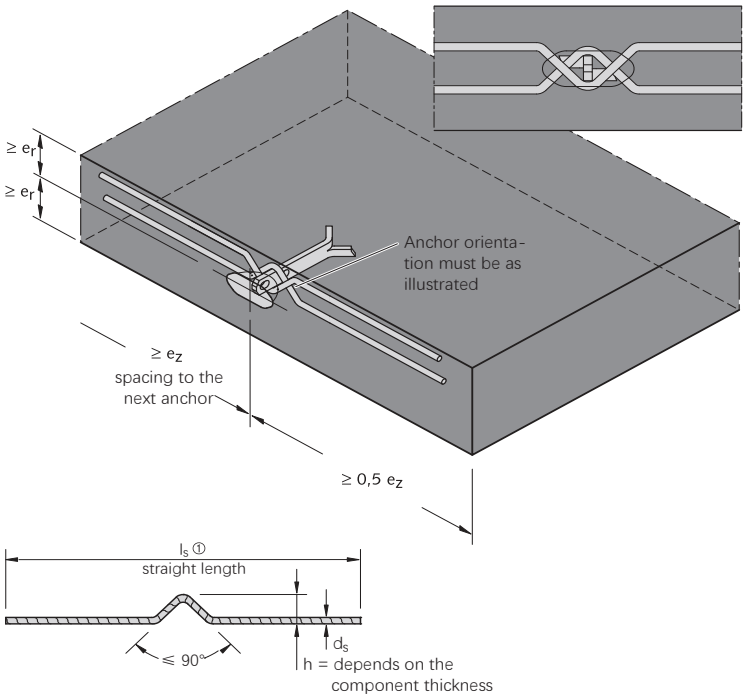
$\beta_W \geqslant 25$ N/mm^2 + 2,5-fold min. thickness of unit

$\beta_W \geqslant 35$ N/mm^2 + 2-fold min. Thickness of Unit

(minimum thickness of unit: $e = 2 \times e_r$)

② Where concrete strength $\beta_W \geqslant 23$ N/mm^2 F_{perm} can be taken as 100%.

③ Angle of β > 60° due to cable spread are impermissible!



The horizontal legs of the tilting and turning reinforcement are located directly within the outermost position of the reinforced area.

Reinforcement steel:
Yield strength 500 N/mm² ,
Tensile strength 550 N/mm²

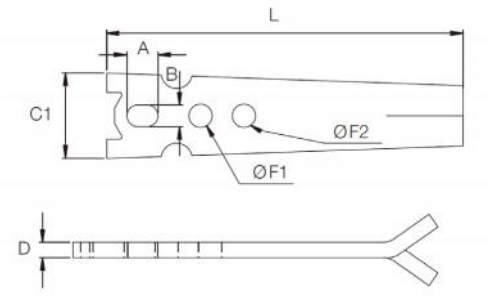
Load Capacity，Installation Dimensions

Concrete Strength βW ≥ 15 N/mm²

Load group [t]	Designation	Minimum distances from edge and between centres for βW ≥ 15N/mm²		Tilting and turning reinforcement		Permitted load		
						Lifting	Lifting ②	Tilting
		e_r [mm]	e_z [mm]	d_s [mm]	① l_s [mm]			
						[kN]	[kN]	[kN]
2.5	DSA 0.7 - 110	100	700	dia. 8	600	7	5.6	3.5
	DSA 1.4 - 160	100	700	dia. 10	700	14	11.2	7.0
	DSA 2.0 - 210	100	800	dia. 10	750	20	16.0	10.0
	DSA 2.5 - 250	100	875	dia. 12	800	25	20.0	12.5
5.0	DSA 3.0 - 280	150	950	dia. 12	850	30	24.0	15.0
	DSA 4.0 - 320	150	1050	dia. 14	950	40	32.0	20.0
	DSA 5.0 - 400	150	1435	dia. 16	1000	50	40.0	25.0
10.0	DSA 7.5 - 420	250	1470	dia. 20	1200	75	60.0	37.5
	DSA 10.0 - 520	300	1820	dia. 20	1500	100	80.0	50.0
26.0	DSA 14.0 - 460	525	1800	dia. 25	1800	140	112.0	70.0
	DSA 22.0 - 620	710	2200	dia. 28	1800	220	176.0	110.0

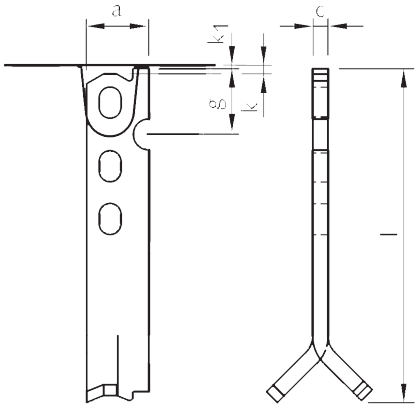
l_s = Length before bending reinforcement steel
For concrete strength $\beta_W \geqslant 23$ N/mm² is 100% of load permitted.
- Required reinforcement: minimum standard reinforcement.

Erection Anchor



Erection Anchor							
MATERIAL	20Mn2 / Q345D / CM490 / Stainless Steel / Customizable						
SURFACE TREATMENT	Raw Color / Electro-galvanized / Hot-dip Galvanized						
SAFETY FACTOR	≥ 3						
CERTIFICATE	ISO9001 / CE						
Load Group (tons)	**CODE**	**SWL (tons)**	**LENGTH (mm)**	**A (mm)**	**B (mm)**	**C (mm)**	**D (mm)**
2.5	ESA014-06-200	1.4	200	20	14	55	6
	ESA025-10-230	2.5	230	20	14	55	10
5.0	ESA040-12-270	4.0	270	22	18	70	12
	ESA050-15-290	5.0	290	22	18	70	15
10.0	ESA075-15-320	7.5	320	31	26	95	15
	ESA100-20-390	10.0	390	31	26	95	20
26.0	ESA125-20-500	12.5	500	-	-	148	20
	ESA170-25-500	17.0	500	-	-	148	25
	ESA220-30-500	22.0	500	-	-	148	30

Unilateral Erection Anchor

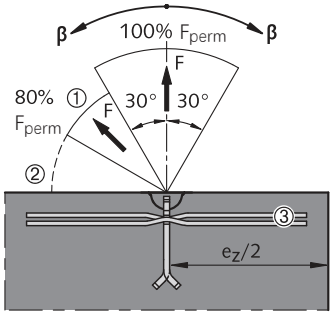


Unilateral Erection Anchor						
MATERIAL	20Mn2 / Q345D / CM490 / Stainless Steel / Customizable					
SURFACE TREATMENT	Raw Color / Electro-galvanized / Hot-dip Galvanized					
SAFETY FACTOR	≥ 3					
CERTIFICATE	ISO9001 / CE					
Load Group (tons)	**CODE**	**SWL (tons)**	**LENGTH (mm)**	**A (mm)**	**C (mm)**	**G (mm)**
2.5	SEA014-06-200	1.4	200	40	6	42.2
	SEA025-10-230	2.5	230	40	10	42.5
5.0	SEA040-12-270	4.0	270	55	12	50.5
	SEA050-15-290	5.0	290	55	15	50.5
10.0	SEA075-15-320	7.5	320	80	15	78.0
	SEA100-20-390	10.0	390	80	20	78.0
26.0	SEA125-20-500	12.5	500	115	20	88.5
	SEA170-25-500	17.0	500	115	25	88.5
	SEA220-30-500	22.0	500	115	30	88.5

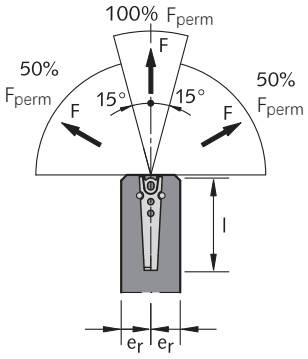
Load Capacity, Installation Dimensions

The erection anchor means that the pitching/turning loads are borne by the anchor instead of the concrete. This prevents concrete spalling. The anchors are notched to aid in the placement of additional reinforcement needed for the pitching/turning process.

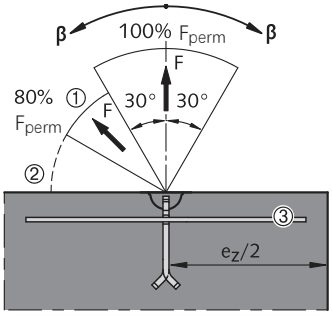
ESA



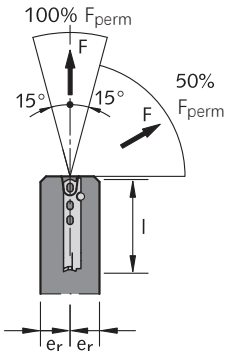
ESA



SEA



SEA



① Where concrete strength $\beta_W \geq 23$ N/mm² Fperm can be taken as 100%.

② Angle of β > 60° due to cable spread are impermissible!

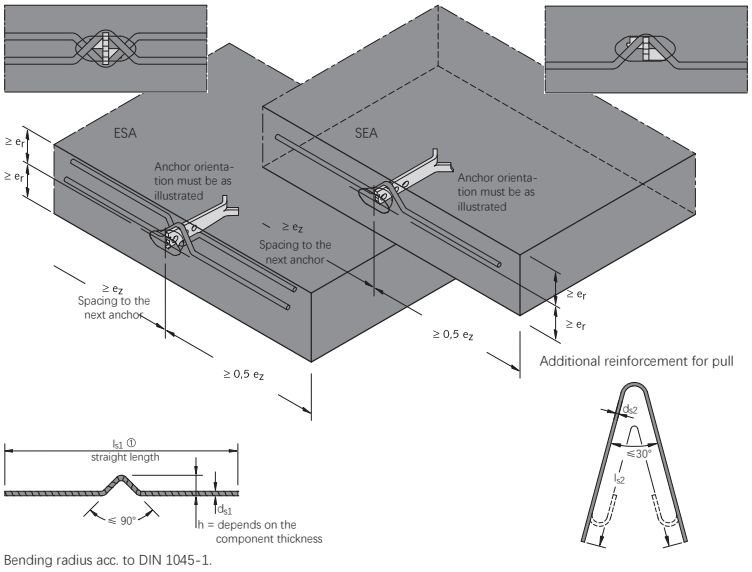
③ Insert the erection reinforcement in the anchor notches.

Load Capacity, Installation Dimensions

Concrete Strength βW ≥ 15 N/mm²

Load group [t]	Load range [t]	Anchor length l [mm]	Spacing between anchor centres e_z [mm]	Minimum thickness of precast element (2 x e_r)				Lifting		Tilting
				with additional reinforcement		without additional reinforcement		Pull (β ≤ 30°)	① Angled Pull (β ≤ 30°)	
				SEA [mm]	ESA [mm]	SEA [mm]	ESA [mm]	100% F_{perm} [kN]	80% F_{perm} [kN]	50% F_{perm} [kN]
2.5	1.4	200	700	90	100	90	100	14	11	7
	2.5	230	800	120	120	120	120	25	20	13
5.0	4.0	270	950	140	150	150	150	40	32	20
	5.0	290	1000	140	160	180	180	50	40	25
10.0	7.5	320	1200	160	175	200	200	75	60	38
	10.0	390	1500	200	200	250	250	100	80	50
26.0	12.5	500	1500	240	240	320	320	125	100	62,5
	17.0	500	1500	300	300	380	380	170	136	85
	22.0	500	1500	360	360	450	450	220	176	110

Reinforcement in Erection Anchor Zone



Bending radius acc. to DIN 1045-1.

The horizontal legs of the tilting and turning reinforcement are located directly within the outermost position of the reinforced area.
Tilting reinforcement on both sides also acts as angled pull reinforcement.
No additional angled pull reinforcement is required.

Without additional reinforcement for pull:
Meshes, slot-in links and edge reinforcement.
With additional reinforcement for pull:
Meshes, slot-in links and edge reinforcement.

Reinforcement of Thin-walled Concrete Precast Unit

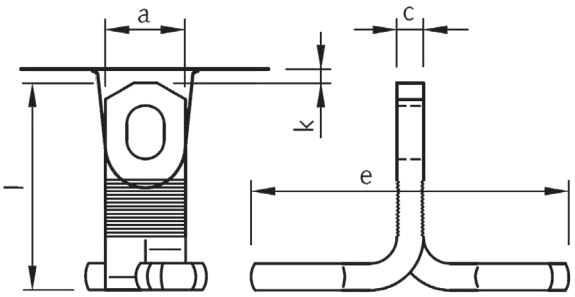
Concrete Strength βW ≥ 15 N/mm²

Load Group [t]	Load rate [t]	Tilting reinforcement d_{s1} x l_{s1} [mm]	Additional reinforcement for pull d_{s2} x l_{s2} [mm]
2.5	1.4	dia. 10 x 700	dia. 10 x 650
	2.5	dia. 12 x 800	dia. 12 x 1000
5.0	4.0	dia. 14 x 950	dia. 16 x 1200
	5.0	dia. 16 x 1000	dia. 16 x 1500
10.0	7.5	dia. 20 x 1200	dia. 20 x 1750
	10.0	dia. 20 x 1500	dia. 20 x 1900
26.0	12.5	dia. 25 x 1500	dia. 25 x 2200
	17.0	dia. 25 x 1800	dia. 28 x 2500
	22.0	dia. 25 x 1800	dia. 28 x 3000

l_{s1} = Length before bending reinforcement steel
For other concrete strength, the length l_{s1} of the erecting reinforcement may be reduced in relation to the permitted composite stresses.
(β_W = 25 N/mm² : x 0,8; β_W = 35 N/mm² : x 0,65)

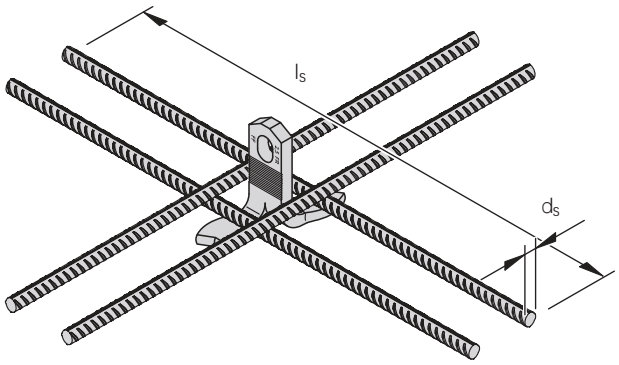
*Tensile strength: 550 N/mm², Yield strength: 500 N/mm²

Flat Foot Spread Anchor

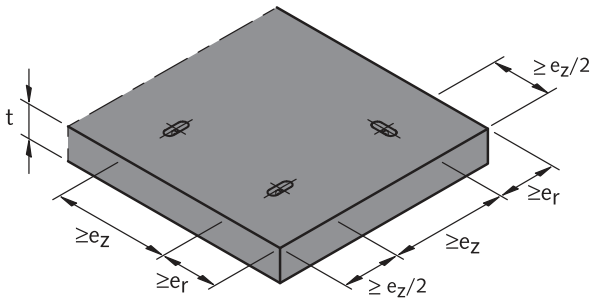


Flat Foot Spread Anchor						
MATERIAL	20Mn2 / Q345D / CM490 / Stainless Steel / Customizable					
SURFACE TREATMENT	Raw Color / Electro-galvanized / Hot-dip Galvanized					
SAFETY FACTOR	≥ 3					
CERTIFICATE	ISO9001 / CE					
Load Group (tons)	CODE	SWL (tons)	LENGTH (mm)	a (mm)	c (mm)	e (mm)
2.5	FSA007-05-065	0.7	65	30	5	70
	FSA014-06-065	1.4	65	30	6	70
	FSA020-08-070	2.0	70	30	8	80
	FSA025-10-075	2.5	75	30	10	94
5.0	FSA030-10-090	3.0	90	40	10	100
	FSA040-12-110	4.0	110	40	12	100
	FSA050-15-125	5.0	125	40	15	105
10.0	FSA075-16-170	7.5	170	60	16	120
	FSA100-20-200	10.0	200	60	20	120
26.0	FSA125-16-220	12.5	220	80	16	200
	FSA170-20-270	17.0	270	80	20	200
	FSA220-28-310	22.0	310	90	28	200

Reinforcement in Flat Foot Anchor Zone



Where loads are acting towards the edge of the element, insert angled pull reinforcement as for spread or two hole anchors.
Position the additional reinforcement bars as close to anchor as possible.



Position the additional reinforcement bars as close to anchor as possible.

Reinforcement in Anchor Zone

Concrete Strength βW ≥ 15 N/mm²

Load Group [t]	Code	Anchor length l [mm]	Minimum thickness of element B [mm]	Minimum distance between centres and from edge		Additional reinforcement *		Permitted load Centrical, angled and transversal pull at concrete strength βW when lifted		
				e_r [mm]	e_z [mm]	d_s [mm]	l_s [mm]	≥ 15 N/mm² [kN]	≥ 25 N/mm² [kN]	≥ 35 N/mm² [kN]
2.5	FSA007-05-065	65	95 ①	140	280	8	200	7	7	7
	FSA014-06-065	65	95 ①	140	280	8	250	14	14	14
	FSA020-08-070	70	100 ①	150	300	8	300	18	20	20
	FSA025-10-075	75	105 ①	160	320	8	300	20	25	25
5.0	FSA030-10-090	90	120	190	380	10	400	28	30	30
	FSA040-12-110	110	140	230	460	12	450	37	40	40
	FSA050-15-125	125	160	260	520	12	500	44	50	50
10.0	FSA075-16-170	170	215	340	680	14	600	54.6	70.4	75
	FSA100-20-200	200	245	400	800	14	600	75.5	100	100
26.0	FSA125-16-220	220	265	440	880	16	750	88.5	125	125
	FSA170-20-270	220	315	540	1080	16	900	120.3	170	170
	FSA220-28-310	310	355	620	1240	20	1100	148	220	220

If corrosion protection is assured, the plate thickness can be reduced.

* Yield strength: 500 N/mm², tensile strength: 550 N/mm²

Plate Spread Anchor

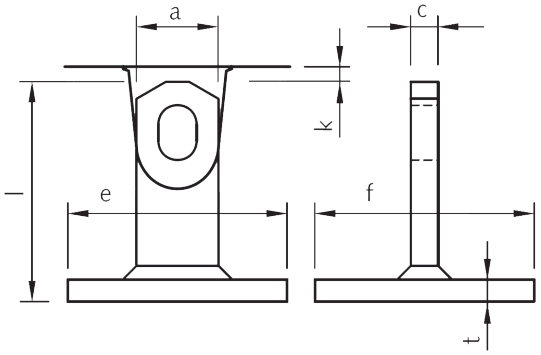
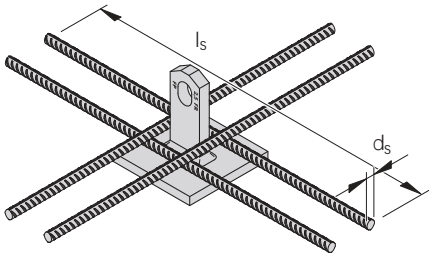
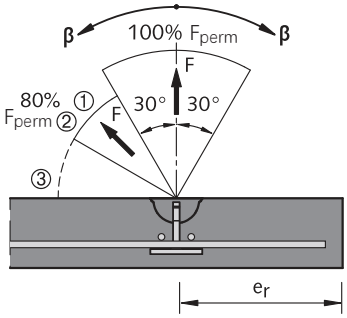
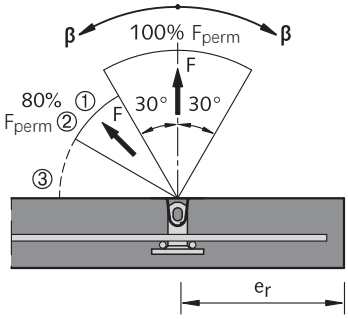


Plate Spread Anchor						
MATERIAL	20Mn2 / Q345D / CM490 / Stainless Steel / Customizable					
SURFACE TREATMENT	Raw Color / Electro-galvanized / Hot-dip Galvanized					
SAFETY FACTOR	≥ 3					
CERTIFICATE	ISO9001 / CE					
Load Group (tons)	CODE	SWL (tons)	LENGTH (mm)	A (mm)	C (mm)	T (mm)
2.5	SPA014-06-055	1.4	55	30	6	8
	SPA025-10-080	2.5	80	30	10	8
5.0	SPA050-15-120	5.0	120	40	15	10
10.0	SPA100-20-160	10.0	160	60	20	12

Load capacity, installation dimensions, additional reinforcement for thin slabs and pipes







Yield strength: 500 N/mm^2,
tensile strength: 550 N/mm^2

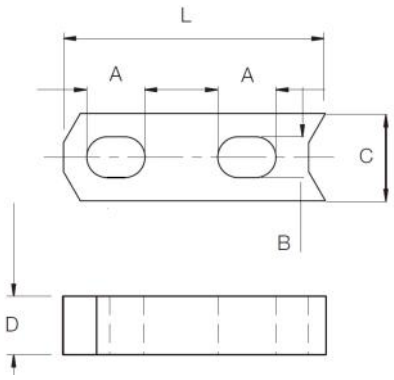
① .Angled pull at 30° < β ⩽ 60° without angled pull reinforcement only permissible when:
$\beta_W \geqslant$ 15 N/mm^2 + 3-fold min. thickness of unit
$\beta_W \geqslant$ 25 N/mm^2 + 2.5-fold min. thickness of unit
$\beta_W \geqslant$ 35 N/mm^2 + 2-fold min. thickness of unit

② .Where concrete strength βW ⩾ 23 N/mm^2 F_{perm} can be taken as 100%.

③ .Angle of β > 60° due to cable spread are impermissible!

Reinforcement							Concrete Strength βW ≥ 15 N/mm^2	
Load Group [t]	Code	Anchor length l [mm]	Minimum spaces between centres and from edge		Additional reinforcement *		100 % F_{perm} Pull	② 80 % F_{perm} Angled pull
			e_r [mm]	e_z [mm]	d_s [mm]	l_s [mm]	(β ≤ 30°) [kN]	(β ≤ 30°) [kN]
2.5	SPA014-08-055	55	115	230	8	200	14	11.2
	SPA025-08-080	80	165	330	10	300	25	20
5.0	SPA050-10-120	120	240	480	12	450	50	40
10.0	SPA100-12-160	160	330	660	16	600	100	80

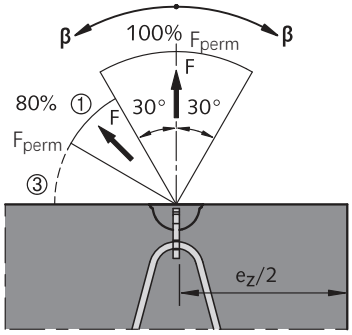
Two Hole Anchor



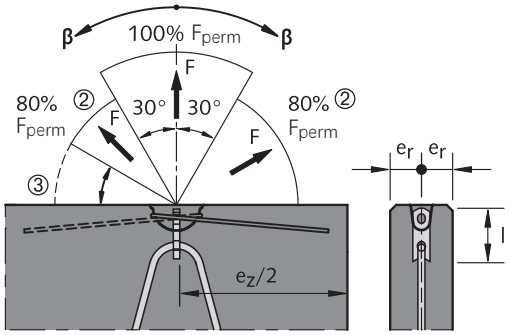
Two Hole Anchor						
MATERIAL	20Mn2 / Q345D / CM490 / Stainless Steel / Customizable					
SURFACE TREATMENT	Raw Color / Electro-galvanized / Hot-dip Galvanized					
SAFETY FACTOR	≥ 3					
CERTIFICATE	ISO9001 / CE					
Load Group (tons)	CODE	LENGTH (mm)	A (mm)	B (mm)	C (mm)	D (mm)
2.5	THA014-05-090	90	20	14	30	5
	THA020-06-090	90	20	14	30	6
	THA025-10-090	90	20	14	30	10
5.0	THA030-10-120	120	22	18	40	10
	THA040-12-120	120	22	18	40	12
	THA050-15-120	120	22	18	40	15
10.0	THA075-16-160	160	31	26	60	16
	THA100-20-160	160	31	26	60	20
26.0	THA260-30-240	240	45	35	80	30

Load capacity, installation dimensions

Without angled pull reinforcement



With angled pull reinforcement



Position the angled pull reinforcement as closely to the recess former as

① .Angled pull at 30° < β ⩽ 60° without angled pull reinforcement only permissible when:

$\beta_W \geqslant 15$ N/mm² + 3-fold min. thickness of unit
$\beta_W \geqslant 25$ N/mm² + 2,5-fold min. thickness of unit
$\beta_W \geqslant 35$ N/mm² + 2-fold min. thickness of unit
(minimum thickness of unit: $e = 2 \times e_r$)

② .Where concrete strength βW ⩾ 23 N/mm² F_{perm} can be taken as 100%.

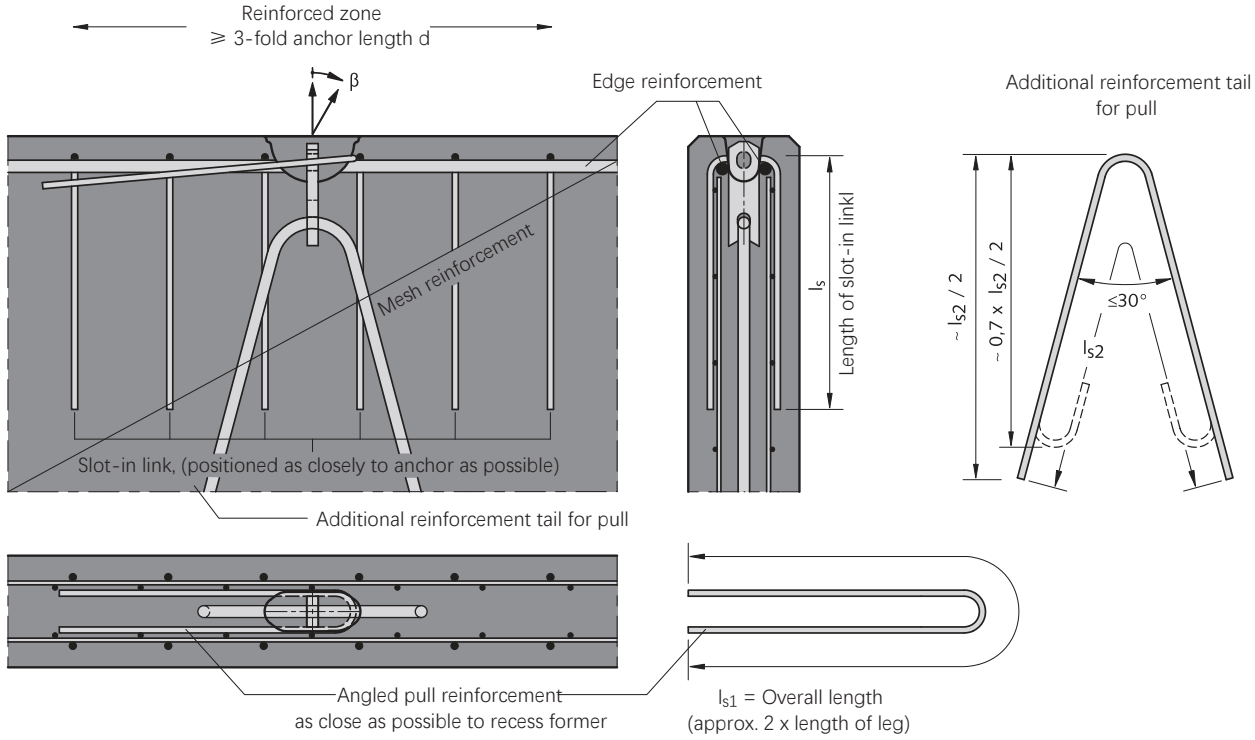
③ .Angle of β > 60° due to cable spread are impermissible!

Load Capacity, Installation Dimensions

Concrete Strength $\beta_W \geq 15$ N/mm²

Designation	Load group [t]	Anchor lenght l [mm]	Spacing between anchor centres ez [mm]	Minimum thickness of precast unit 2 x er [mm]	100% Fperm Pull (β ≤ 30°) [kN]	80% Fperm Angled pull (β > 30°) [kN]
THA014-05-090	2.5	90	500	80	14	11.2
THA020-06-090		90	600	90	20	16
THA030-10-120	5.0	120	650	100	30	24
THA040-12-120		120	700	110	40	32
THA050-15-120		120	750	120	50	40
THA075-16-160	10.0	160	1200	130	75	60
THA260-30-240	26.0	240	1500	200	260	208

Reinforcement in anchor zone

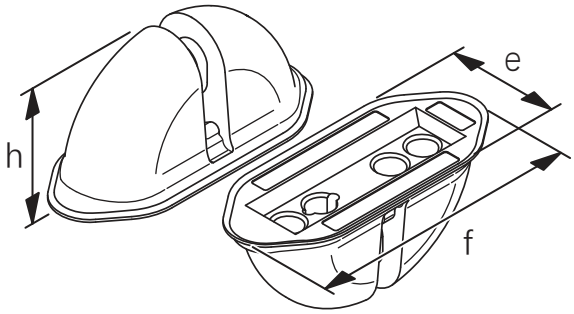


Reinforcement

Concrete Strength $\beta_W \geq 15$ N/mm²

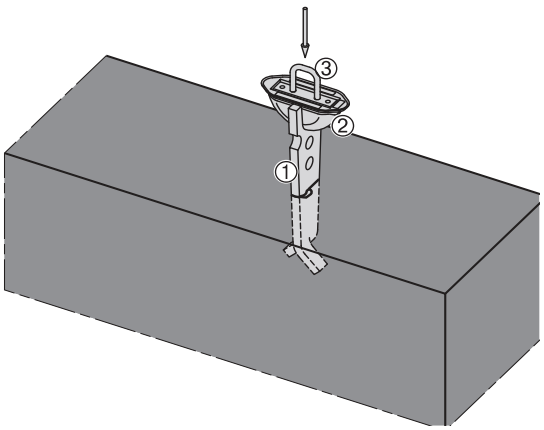
Load group [t]	Designation	Pull (β ≤ 30°)				Angled pull (β > 30°)				
		Mesh reinf. both sides crosswise* [mm²/m]	Slot-in links * ds x ls [mm]	Edge reinf.* [mm]	② Add. reinf. for pull d_{s2} x l_{s2} both sides [mm]	Mesh reinf. both sides crosswise* [mm²/m]	Slot-in links * d_s x l_s [mm]	Edge reinf.* [mm]	② Add. reinf. for pull d_{s2} x l_{s2} [mm]	① Angled Pull reinf d_{s1} x l_{s1} [mm]
2.5	THA014-05-090	131	2 dia. 6 x 400	constructive	1 dia. 10 x 650	131	4 dia. 6 x 400	dia. 8	1 dia. 10 x 650	dia. 6 x 900
	THA020-06-090	131	2 dia. 6 x 400	constructive	1 dia. 12 x 650	131	4 dia. 6 x 500	dia. 8	1 dia. 10 x 800	dia.8 x 950
	THA025-08-090	131	2 dia. 8 x 600	constructive	1 dia. 12 x 1000	131	4 dia. 8 x 600	dia. 10	1 dia. 12 x 1000	dia. 8 x 1200
	THA030-10-120	131	2 dia. 8 x 700	constructive	1 dia. 14 x 1000	131	4 dia. 8 x 700	dia. 10	1 dia. 14 x 1000	dia. 10 x 1150
5.0	THA040-12-120	131	2 dia. 8 x 700	constructive	1 dia. 16 x 1200	131	4 dia. 8 x 800	dia. 12	1 dia. 16 x 1200	dia. 10 x 1500
	THA050-15-120	131	2 dia. 8 x 800	constructive	1 dia. 16 x 1500	131	4 dia. 10 x 800	dia. 12	1 dia. 16 x 1500	dia. 12 x 1550
10.0	THA075-16-160	131	2 dia. 10 x 800	dia. 10	1 dia. 20 x 1750	131	4 dia. 10 x 800	dia. 12	1 dia. 20 x 1750	dia. 14 x 2000
26.0	THA260-20-240	131	6 dia. 12 x 1200	dia. 14	2 dia. 28 x 3050	131	8 dia. 12 x 1200	dia. 16	2 dia. 28 x 3050	dia. 28 x 3450

Recess Former



Recess Former					
MATERIAL	Rubber / Customizable				
CERTIFICATE	ISO9001 / CE				
Load Group (tons)	CODE	e (mm)	f (mm)	h (mm)	Thread (M)
2.5	SRF025-104	43	104	45	8
5.0	SRF050-126	49	126	59	8
10.0	SRF100-188	67	188	85	12
26.0	SRF260-234	112	234	118	16

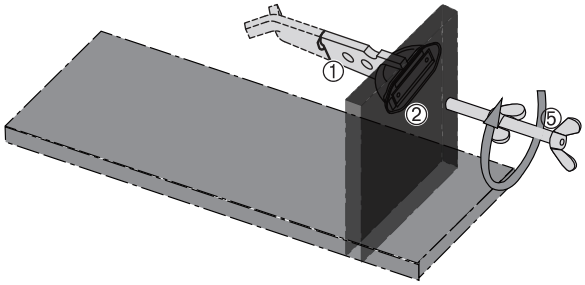
Installation of Spread Anchors



Floating installation

Application for: columns, beams, trusses, π-slabs
Installation aid: **Holding plate**

Open up recess former ② insert anchor ① , press holding plate ③ into recess former and press into the wet concrete.



Mounting on the formwork (wood/steel)

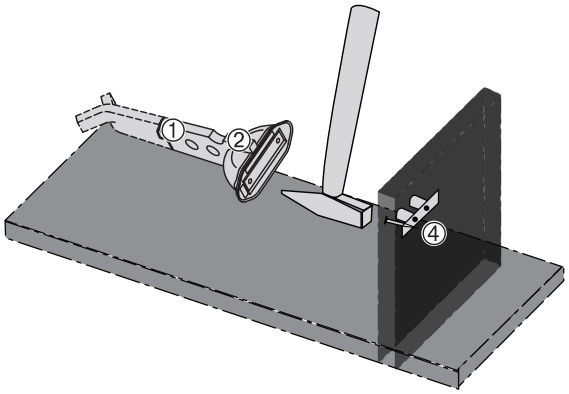
Installation aid: **Holding bold S1 or S2**

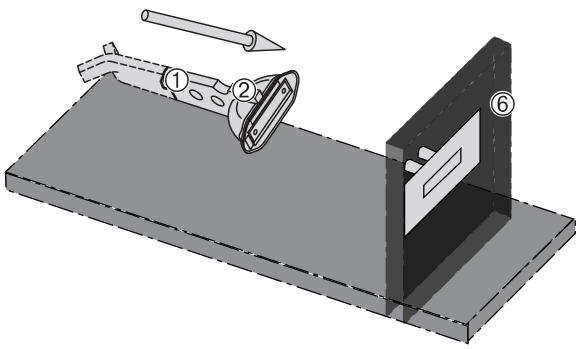
Drill through the formwork, push through the holding bolt ⑤ , screw into the recess former ② , with inserted anchor ① , draw up against formwork and tighten with wing nut.

Mounting on the formwork (wood)

Installation aid: **Holding plate**

Nail or screw the holding plate ④ onto the formwork. Press on the recess former ② , with inserted anchor ① .



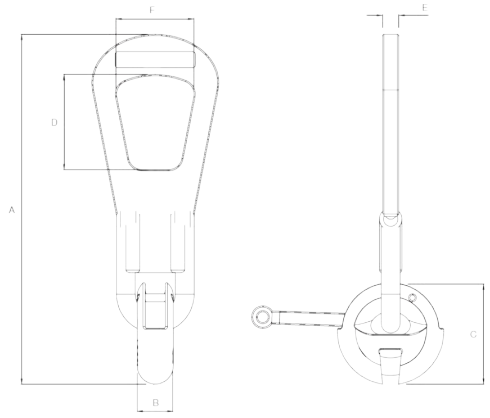


Mounting on the formwork (steel)

Installation aid: **Magnetic plate**

Magnetic holding plate ⑥ grips the formwork. Press the recess former ② , with inserted anchor ① onto pins.

Ring Clutch



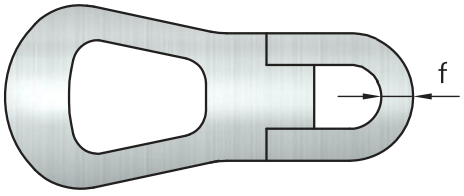
Ring Clutch

MATERIAL	Q345D / Q355D / CM490 / G30CrMoV / Customizable
SURFACE TREATMENT	Electro-galvanized
SAFETY FACTOR	≥ 5
CERTIFICATE	ISO9001 / CE

SWL (tons)	CODE	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)
2.5	RC025-261	261	27	80	70	50
5.0	RC050-330	330	36	100	86	71
10.0	RC100-425	425	50	140	112	90
26.0	RC260-605	605	72	209	160	120

Shackle (RC)

Load group [t]	Nominal dimensions f [mm]	Minimum dimension f [mm]
2.5	14	13
5.0	20	19
10.0	26	25
26.0	40	38.5



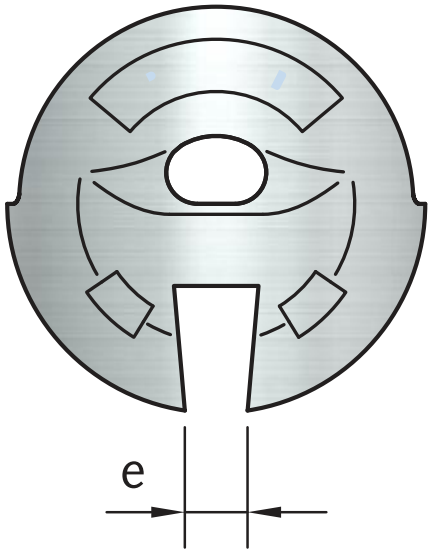
Shackle

Clutches with visible signs of damage or excessive wear must be withdrawn immediately. For allowable tolerance due to wear see the table below.

Like all load-carrying devices, ring clutches must be checked at least once annually by an expert for safe operating condition. There is no fixed working life HULK Metal Ring Clutches. When checking ring clutches, the following points should be observed:

Clutch Head

If the clutch head is deformed or the mouth opening is enlarged, the ring clutch has to be withdrawn and can not be repaired. For allowable tolerance due to wear see the table below.

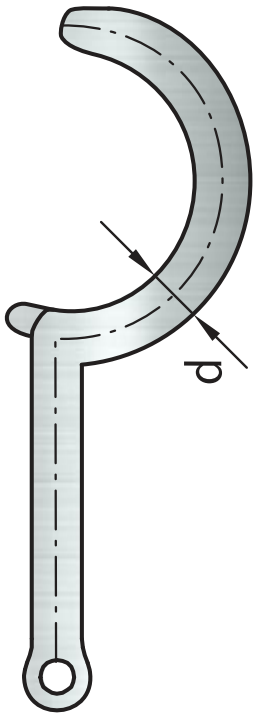


Clutch Head		
Load Group [t]	Nominal dimensions e [mm]	Minimum dimension e [mm]
1.25	7.0 ±0.12	8.0
2.5	12.0 ±0.5	13.0
5.0	18.0 +0.5/-1.0	19.5
10.0	22.0 ±0.5	23.5
26.0	34.0 +2.0/-1.0	37.0

Locking Bolt

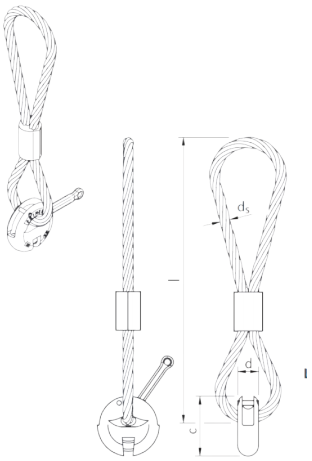
Ring clutches with worn or bent locking bolts must be taken out of use.

For allowable tolerance due to wear see the table below.



Locking Bolt		
Load Group [t]	Nominal dimensions d [mm]	Minimum dimension d [mm]
1.25	8.0 +0.4/-0.6	7.0
2.5	13.0 +0.7/-0.4	12.0
5.0	16.5 +0.7/-0.4	15.5
10.0	23.5 +0.8/-0.4	22.5
26.0	32.0 +0.9/-0.5	31.0

Wire Loop Ring Clutch



Wire Loop Ring Clutch

MATERIAL	Q345D / Q355D / CM490 / G30CrMoV / Customizable				
SURFACE TREATMENT	Electro-galvanized				
SAFETY FACTOR	≥ 5				
CERTIFICATE	ISO9001 / CE				
SWL (tons)	**CODE**	**LENGTH (mm)**	**c (mm)**	**d (mm)**	**d_s (mm)**
1.25	RC0125-20-0320	320	52	20	dia. 8
2.5	RC0250-27-0560	560	80	27	dia.14
5.0	RC0500-36-0595	595	105	36	dia.18
10.0	RC1000-50-0702	702	150	50	dia.22
26.0	RC2600-72-1570	1570	206	72	dia.32

Wire Loop should be checked for the following defects:

- Kinking and buckling
- One braid broken
- Slackening of the outermost exposed layer on free length
- Crushing on free lengths
- Crushing at the eye´s contact point with more than 4 ruptured wires on braided loops, or more than 10 ruptured wires on looplaid rope
- Corrosion marks
- Damage or severe wear to the loop connector or loop-end connector
- High number or ruptured wires

The loop must be taken out of use if the following numbers of ruptured wires are found. (depending from the rope diameter)

Checking of the wire loops has to include for signs of slipping between the loop and the swaged clamp. Acids, alkaline fluids and other aggressive media, that can cause corrosion, must be kept away from the wire loops.
Crane hooks must have a large radius. Sharp-edged hooks or hooks with small cross-section, and therefore small radii, can lead to unacceptable damage of the wire loops.

Wire Cables (RC)			
Cable type	No. of visible ruptured wires over a lenght of		
	3d	6d	30d
Braided cable	4	6	16

Spread Anchors Using Process

1. Removing the formwork sections

Before lifting the precast concrete unit, as many sections of the formwork as possible should be removed in order to minimise adhesion to the formwork. Inadequate stripping is the most common cause of flaking of the precast concrete unit or of anchor failure. The forces acting on the lifting system may be several times the actual weight of the precast unit.

2. Removing the recess formers

To strip the recess former, two rods are inserted in the holes in the recess former, which is then levered out by scissors action. This technique will guarantee a long life time for the recess former. Attempting to remove the recess former using the tip of a carpenter‘s hammer will destroy it.

3. Fitting the ring clutch

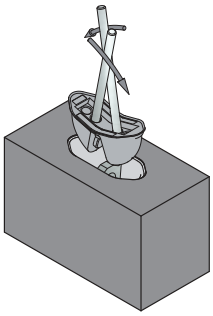
To transport an element, insert the suitable ring clutch for the load group over the anchor head in the concrete recess. The load ranges are foolproof.

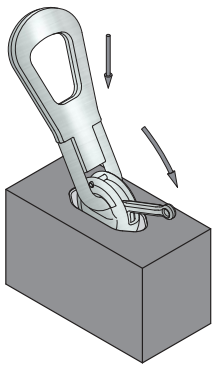
4. Locking the ring clutch

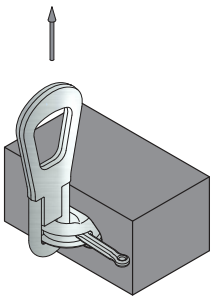
Securely lock the ring clutch with a straightforward hand-operated movement of the locking bolt. The resulting connection is secure, allowing the ring clutch to move freely in any direction. The precast element can now be safely lifted out of the formwork and transported to its storage location.

5. Assembly

A primary advantage of the HULK Metal Rapid Lift System is that the slinging devices (ring clutches) remain attached to the crane hook and do not need to be transported by hand.
The ring clutch can be released manually by pushing back the locking bolt once the device is off-loaded.







Warning:
Spread Anchors must be used with the correct recess former. Then only the correct ring clutch will fit the anchor.

6. Tilting slabs without tilting the table

The hulk metal ring clutch can be used to move flat-manufactured precast units from a horizontal to a vertical position. The direction of the pull is at right angles to the built-in anchor.
To avoid flaking of the concrete, the erection anchor should be properly embedded in the unit.
The use of cross-beams when lifting is recommended to avoid torsional forces.

Application and Misuse of Ring Clutch

1. Engaging:

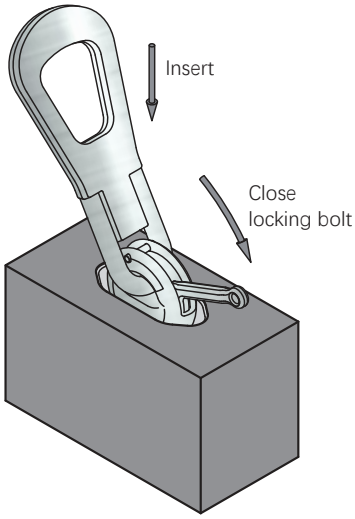
Insert the ring clutch into the recess in the concrete and securely fasten the locking bolt or slide manually until it reaches the maximum position. Proceed with the lifting operation.

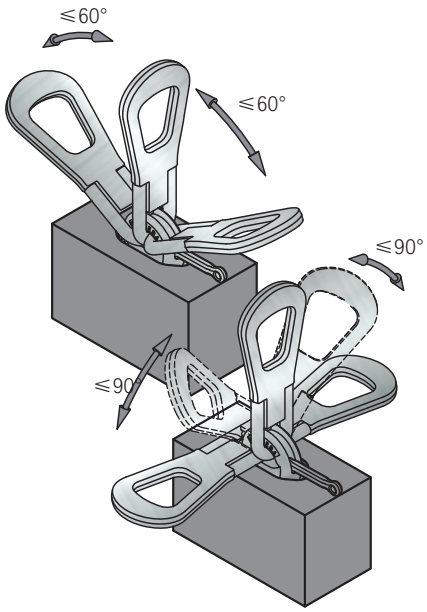
2. Lifting:

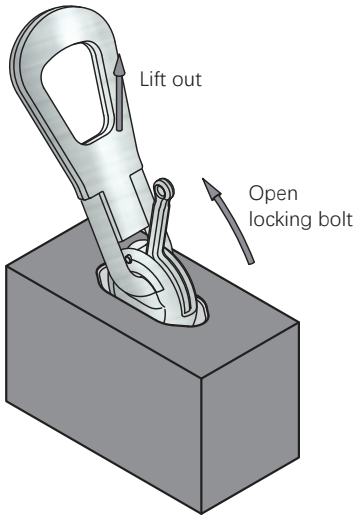
The ring clutch can be subjected to loads in any direction (do not exceed the load limits of the anchors!). Angled pull of up to 60° due to the use of a spreader is permissible.

3. Releasing:

Manual ring clutch: push back the bolt by hand. Now the ring clutch is released.





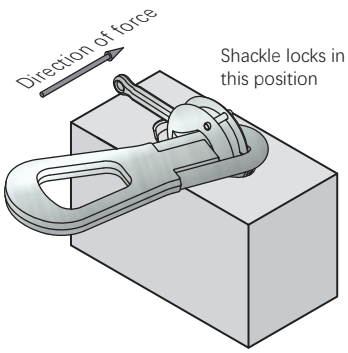


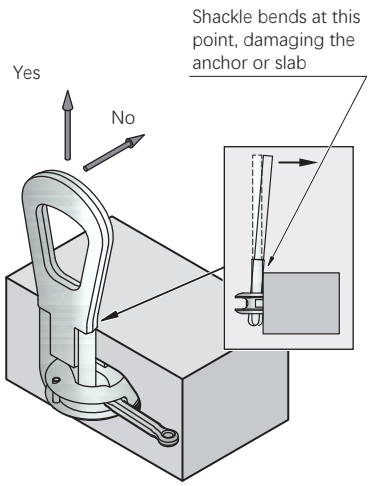
Misuse of the Ring Clutch

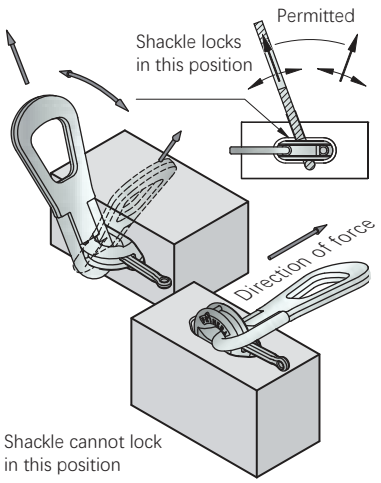
If the shackle is beneath the clutch head when subjected to the load, it may lock in the position illustrated. The round shackle will become bent then when the load is raised.

If the shackle is pulled towards the top surface of the slab when subjected to the load, it may become bent on the edge of the slab.

In the upper position, the shackle may lock within the clutch housing.
A narrow lifting cable angle will cause the shackle to become bent. The problem can be overcome by turning the shackle through approx 45° .



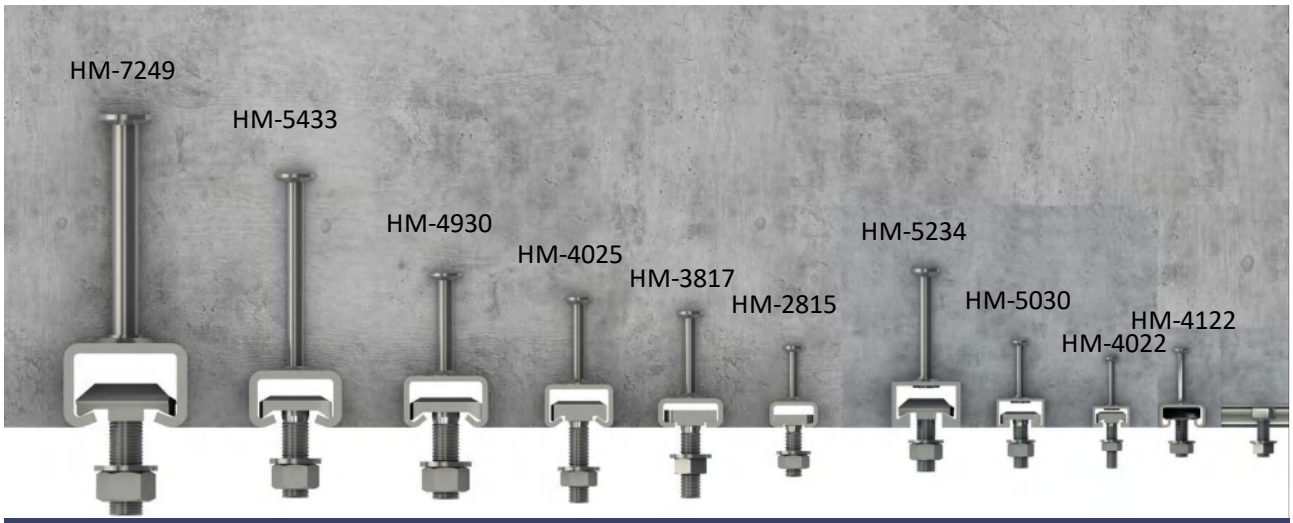




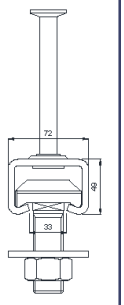
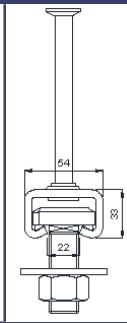
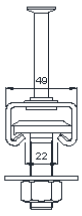
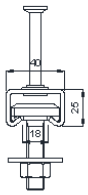
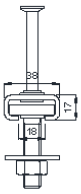
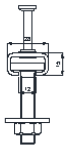
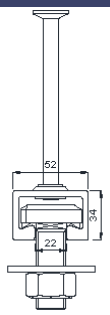
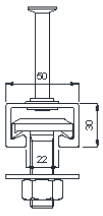
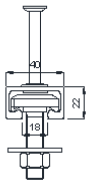
Cast-in Channel

HULKMETAL

Cast in Channel



Dimensions and Tolerances of the HM Cast in Channel

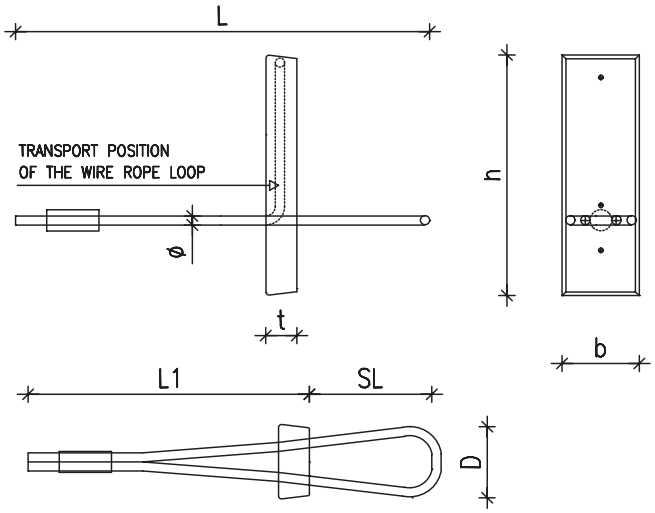
									
HM-7249	HM-5433	HM-4930	HM-4025	HM-3817	HM-2815	HM-5234	HM-5030	HM-4022	HM-4122
Channel Section (mm)									
72/49	54/33	49/30	40/25	38/17	28/15	52/34	50/30	40/22	41/22
T.Bolt min spacing (mm)									
121	80	74	64	47	41	81	73	58	28
T.Bolt Size									
M20/ 24/30	M12/ 16/20	M12/ 16/20	M10/ 12/16	M10/ 12/16	M8/ 10/12	M20/ 24/30	M12/ 16/20	M12/ 16/20	M12/16
Design Resistance Capacities of Profiles (Design values)(KN)									
45.0	41.6	17.2	12.2	10.6	7.2	30.6	17.2	11.1	15.8

Materials	Q235B / Stainless Steel / Customized
Packaging	Wooden case / Carton / Bulk / Individually Packaged / Customized
Service	Freight consulting / Quality inspection / After Service / Other value-added services.
Delivery Method	Sea / Air / Land

Wire Loop Box

HULKMETAL

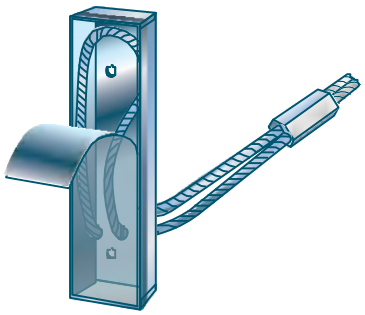
HULK Metal Wire Loop Box

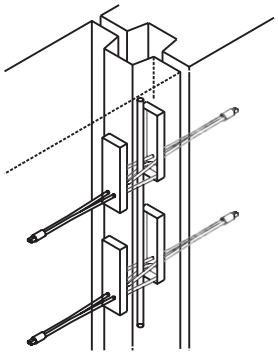


HULK Metal Wire Loop Box								
Types	SL [mm] ±10	L1 [mm] ±10	L [mm] ±20	C [mm] ±2	D [mm]	B [mm] ±2	T [mm] ±2	Φ [mm]
HM-60	60	210	276	160	60	50	20	6
HM-80	80	210	296	160	60	50	20	6
HM-100	100	210	316	160	65	50	20	6
HM-120	120	210	336	160	70	50	20	6
HM-140	140	370	528	200	100	70	30	8

Thickness of the Steel Plate of the Box
0.5~0.7mm

Materials of the Wire Loop Box	
Compression Sleeve	20# Steel
Wire Loop	high strength steel wire rope SE-Zn
Box	galvanized sheet
Packaging	Wooden case / Carton / Bulk /Individually Packaged / Customized
Service	Freight consulting / Quality inspection / After-sales / Other value-added services.
Delivery Method	Sea / Air / Land
Quality Assurance	Life-Long





Wire Loop Boxes are designed to be used as a structural connection for pre-cast units with recesses, or between precast units and in-situ concrete components. The casing of the box eliminates the need for additional formwork. The rope boxes are very easy to use on site, with no-tool tear-off tape that releases the flexible loops. The loops are stitched into the adjoining element with rods and insitu concrete.

You Will Enjoy Them When You Buy Wire Loop Box in HULK Metal.

Higher Quality Wire Loop Box:

We own factory equipped with advanced production equipment and testing equipment.

We also have experienced quality inspection team to ensure your orders' Qualification rate.

Shorter Production Cycle:

We will Design a better production solution for you according your requirements.

We have a full range of wire loop box molds.

Our production team can complete your orders faster.

Best Freight Solution:

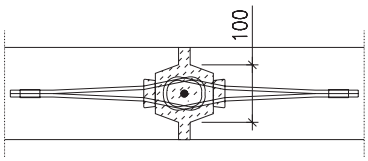
We integrated hundreds of freight companies to provide you with suitable freight routes.

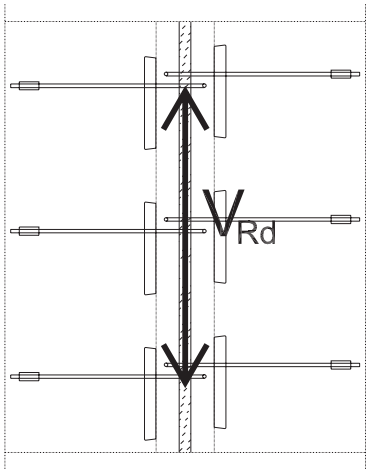
We also provide goods transit, goods warehousing, and other freight services.

Comprehensive After Service:

We have professional after service team to solve problems about technology, freight, quality, and others.

Capacities:





Design Principles:

The capacities presented in the tables below are calculated for static loads. Our wire rope loops are not designed to be used for dynamic loading or for lifting. For the capacities to be achieved, there should be no cracks or deformations in the joints.

The capacities of the wire rope loops are calculated for a joint as presented in the diagram with seam thickness and reinforcement as outlined in the following sections. The steel boxes and the seam must be fully filled with concrete.

The capacities given are the resistances in ultimate limit state, so please compare to design loads.

The resistance is defined by the weakest concrete in the joint (element/joint concrete). Resistances are calculated for concrete classes C25/30, C30/37 and C40/50.

Longitudinal Shear Capacity

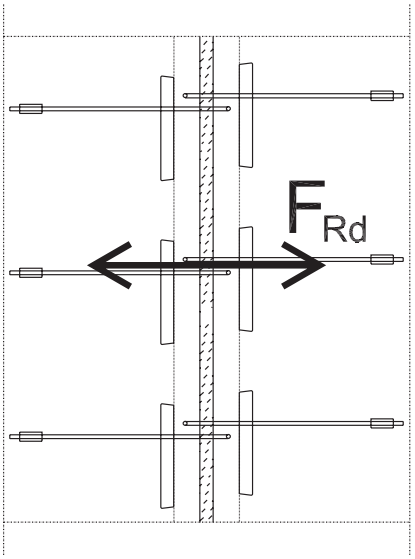
Boxes Centre to Centre	Design Value of Longitudinal Shear Resistance, VRd (kN/m)			
	Standard			
	HM-60, -80, -100, -120		HM-140	
	C25/30	C40/50	C25/30	C40/50
250	125	159	-	-
300	117	148	-	-
350	101	128	182	230
400	89	112	163	207
450	79	100	146	184
500	72	91	131	166
550	66	83	120	152
600	60	76	110	139
650	56	71	102	129
700	52	66	95	120
750	49	62	-	-

The resistance is defined by the weakest concrete in the system, either to fill the joint or the concrete used to make the precast element.

Tensile Capacities:

Capacities are shown here per box

Box Type	Part No.	Design Value of Tensile Resistance, FRd (kN)	
		C25/30	C40/50
Standard	HM-60	12.9	12.9
	HM-80		
	HM-100		
	HM-120		
	HM-140	23.1	23.1

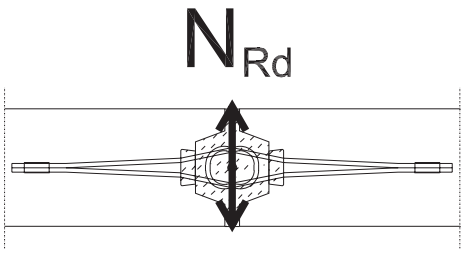


The resistance is defined by the weakest concrete in the system, either to fill the joint or the concrete used to make the precast element. The distance between wire loop boxes must be as defined later in this section.

Transversal Shear Force:

Capacities are shown here per box

Box Type	Part No.	Design Value of Horizontal Shear Resistance, NRd (kN)	
		C25/30	C40/50
Standard	HM-60	4.6	5.8
	HM-80	8.2	10.3
	HM-100		
	HM-120		
	HM-140		



The resistance is defined by the weakest concrete in the system, either to fill the joint or the concrete used to make the precast element. The distance between wire loop boxes must be as defined later in this section.

Combined Forces:

For circumstances where there is a combination of forces on the wire loop joints, the following must apply:

$$\frac{V_{Applied}}{V_{Rd}} + \frac{F_{Applied}}{F_{Rd}} + \frac{N_{Applied}}{N_{Rd}} \leq 1$$

Installation:

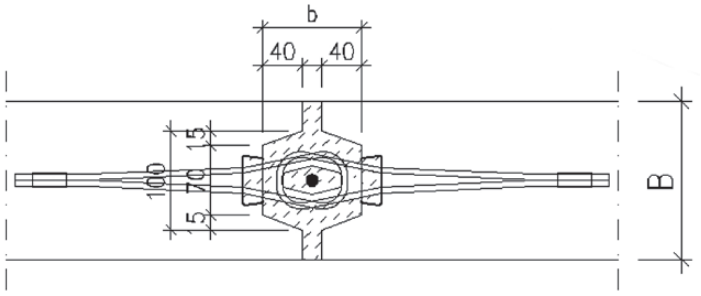
The wall elements must be reinforced according to the wall element design

Seam Thickness (b):

The size of the wire rope loops must be chosen according to the thickness of the joint to enable the vertical ribbed steel bar in the joint to pass through the wire rope loops on both side of the joint.

Box Type	Part No.	Recommended Thickness of Rope Loop Seam (mm)
Standard	HM-60	70-90
	HM-80	90-110
	HM-100	110-140
	HM-120	140-190
	HM-140	160-220

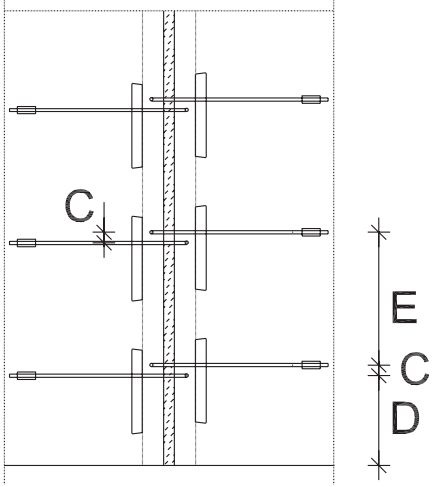
Indented joint dimensions used in calculations for transversal shear force.



Minimum Edge Distance and Spacing:

Centre to centre Emin = minimum distance between wire rope loops at the same side of the joint.
Centre to centre Cmax = minimum distance between wire rope loops at opposite sides of the joint.
Minimum width Bmin = minimum total wall width.

Dimensions for Standard and Maxi Boxes

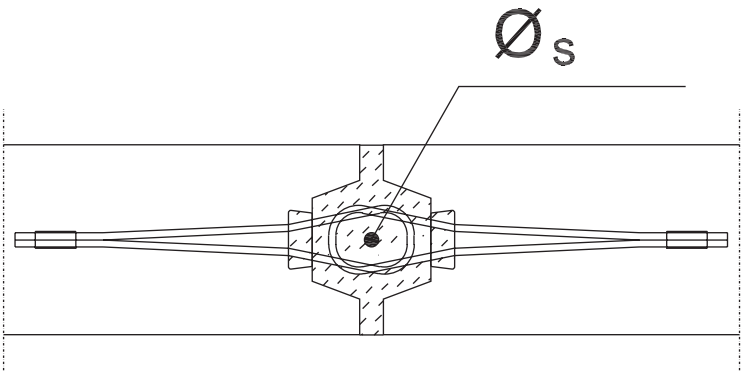


Part No.	Centre to Centre Emin	Edge Distance Dmin	Centre to Centre Cmax	Minimum Width Bmin
	mm			
HM-60	250	100	20	120
HM-80				
HM-100				
HM-120				
HM-140	350	200	25	150

Reinforcement of the Joint:

When using wire loops boxes, a vertical ribbed steel bar must always be installed through the wire loops as shown here.

Box Type	Part No.	Recommended Thickness of Rope Loop Seam (mm)
Standard	HM-60	12
	HM-80	12
	HM-100	12
	HM-120	12
	HM-140	16



Installation:

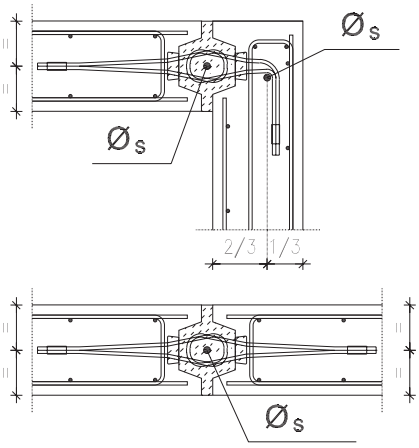
When using wire loop boxes, a vertical ribbed steel bar must always be installed through the wire loops as shown here.

Case 1 – Where wire loops are used to transfer forces.

When HM wire loop boxes are used to transfer forces in the joint, anchorage of the wire loop box must be secured by overlapping the wire loop box sufficiently with the reinforcement of the concrete element. This should be done to the engineer's design depending on your precise arrangement.

Where the wire loop is used in a corner joint a reinforcing bar should be installed into the inner edge of the fold of the HM wire loop box, the diameter of this bar should be the same as the reinforcement installed in the joint.

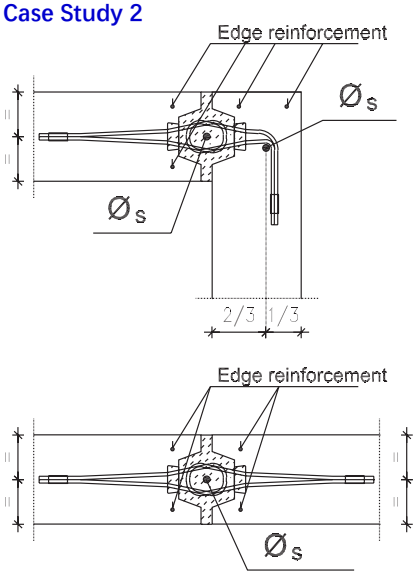
Case Study 1



Case 2 – Where HM wire loops are not used to transfer forces.

When wire loops boxes are used to limit cracking of the seam or to tie elements together without defining the required force, additional reinforcement in the wall is recommended as shown here, including 2 No 10mm diameter additional bars in each piece.

Case Study 2



Attachment to the formwork:

The wire rope loop box must be attached securely so it cannot move during casting of the concrete. At the wire rope loop, the concrete must be compacted carefully as the loop cannot be vibrated. The wire rope loops boxes may be fastened to formwork with nails or by magnets.

The part of the wire rope which enters the concrete element is installed amidst the reinforcement and does not need to be tied to the reinforcement.

Magnets System

HULKMETAL

Precast Magnets

Item No.	Adhesive Force	Item Size	Net Weight
HM-SMB-600	600KG	17*6*4cm	1.8KG
HM-SMB-800	800KG	19*9*4cm	3.0KG
HM-SMB-900	900KG	19*9*4cm	3.2KG
HM-SMB-1000	1000KG	28*6*4cm	3.2KG
HM-SMB-1300	1300KG	32*9*5cm	6.5KG

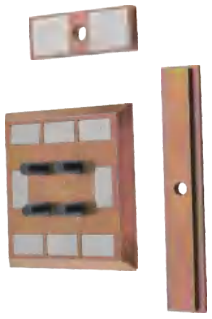
Item No.	Adhesive Force	Item Size	Net Weight
HM-FM-1	600KG	330*150*35MM	11KG
HM-FM-2	400KG	250*250*70MM	6.8KG

Item No.	Adhesive Force	Item Size	Hold
HM-MP-1	2100KG	240*90*25mm	10
HM-MP-2	1800KG	240*90*25mm	10
HM-MP-3	1350KG	240*68*25mm	10
HM-MP-4	1000KG	112*80*25mm	8
HM-MP-5	900KG	220*43*25mm	8
HM-MP-6	800KG	112*75*25mm	8
HM-MP-7	450KG	112*43*25mm	8

Item No.	Adhesive Force	Item Size	Net Weight
HM-MT-1	600KG*2	500*60*70mm	8.1KG
HM-MT-2	900KG*2	750*60*70mm	13.2KG
HM-MT-3	900KG*2	1000*60*70mm	19.0KG
HM-MT-4	900KG*2	1250*60*70mm	23.2KG
HM-MT-5	900KG*2	2000*60*70mm	28.3KG
HM-MT-6	900KG*2	2500*60*70mm	33.5KG
HM-MT-7	900KG*2	3000*60*70mm	38.2KG

Item No.	Adhesive Force	Item Size	Screw Thread
HM-FMB-1.3t	50KG	D60*27mm	M8
HM-FMB-2.5t	100KG	D74*33mm	M10
HM-FMB-5.0t	120KG	D94*42mm	M10
HM-FMB-10.0t	190KG	D118*53mm	M12

Item No.	Adhesive Force	Item Size	Net Weight
HM-TM-1	900KG	250*54*45*35MM	2.3KG

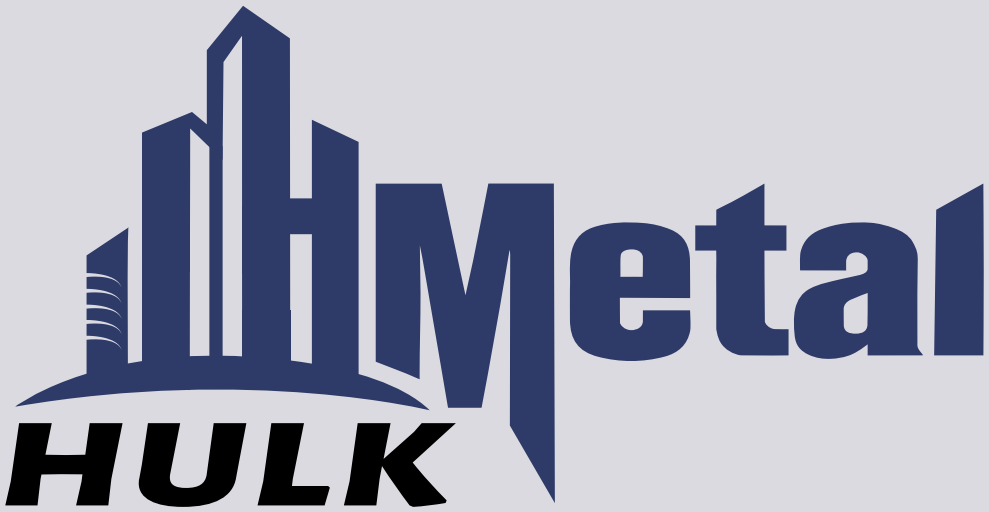


Item No.	Adhesive Force	Item Size	Net Weight
HM-CSM-450	450KG	17*6*4cm	1.8KG
HM-CSM-900	900KG	28*6*4cm	3.0KG
HM-CSM-1350	1350KG	32*9*6cm	6.0KG
HM-CSM-1800	1800KG	32*12*6cm	7.6KG
HM-CSM-2100	2100KG	32*12*6cm	7.8KG
HM-CSM-2500	2500KG	32*12*6cm	7.8KG

Item No.	Adhesive Force	Item Size	Net Weight
HM-MBW-50	50KG	86*86*4cm	1.8KG

Item No.	Adhesive Force	Item Size	Screw Thread
HM-PSMB-20	20KG	D40*10mm	M14,M16
HM-PSMB-50	50KG	D50*10mm	M12,M14,M16,M18
HM-PSMB-60	60KG	D60*10mm	M16,M18,M20,M24
HM-PSMB-70	70KG	D70*10mm	M20,M24,M30

Item No.	Adhesive Force	Item Size	Net Weight
HM-HSM-1	1000KG	240*60*50mm	5KG
HM-HSM-2	1600KG	240*90*50mm	7.5KG
HM-HSM-3	2000KG	240*90*50mm	11KG
HM-HSM-4	2500KG	240*94*50mm	12.5KG
HM-HSM-5	3000KG	240*94*50mm	15KG



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