



PRECAST PRODUCT GUIDE AND TECHNICAL MANUAL

**THE PROFESSIONAL CHOICE FOR
ALL YOUR PRECAST CONCRETE
ANCHORS AND ACCESSORIES**

[Capstan Anchors](#)

[Utility Anchors](#)

[Threaded Lifting and Fixing Systems](#)

[Spread Anchor Systems](#)

[Precast Accessories](#)

RFA-TECH PRECAST LIFTING SYSTEMS

RFA-TECH supplies an extensive range of precast lifting and fixing products and systems for concrete manufacturers. We provide engineered solutions for bespoke precast applications and have a dedicated team of experienced personnel offering sales and technical support to assist in all types of projects. We work closely with all our customers to ensure that they are using the most economical and safest products throughout their production.

Our test and inspection laboratory, situated in Lichfield, has a comprehensive range of test and inspection equipment calibrated to UKAS standards and is the central hub for testing all RFA-Tech lifting and fixing products. We rigorously inspect and test our products and have CE approval for all relevant products. Our quality systems and procedures guarantee that we comply with all relevant legislation and have full traceability from source to factory floor.

From small architectural products through to bridge beams and sea defence schemes, whatever the project, RFA-TECH will have a solution to your fixing needs.

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TESTING AND ACCREDITATION

In-House Testing Facility

RFA-Tech has invested significant resources into ensuring all its products are compliant with the relevant legislation.



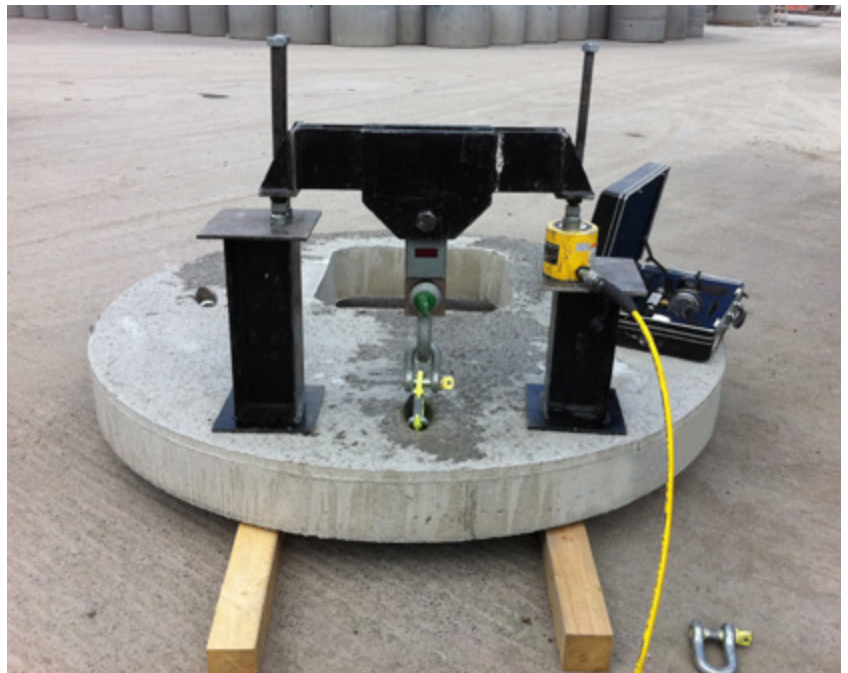
Our laboratory based in Lichfield is the central hub for testing all reinforcement products for the Celsa Steels Group in the UK. The test apparatus and equipment at this facility is fully UKAS calibrated and all the technicians have the necessary training and qualifications to test and inspect all the products in our range.

All our quality team have the LOLER qualification (Lifting Operations and Equipment Regulations 1998) that allows us to inspect and test all the products and have completed the CE marking of all products that have to comply with the latest regulations. All our lifting products comply with the 2006/42/EC machinery directive and are supplied with the CE mark and Declaration of Conformity.



On-Site Testing Facility.

RFA-Tech also offer our customer the option to use our on site testing equipment when required. We have two test rigs available, one up to 40 tonnes at 800mm span and one for 30 tonnes at a 1200mm span. Whether this is for product development, project engineer's piece of mind or an ongoing production monitoring system, we have the equipment you need.



PRECAST CONCRETE LIFTING DESIGN

When designing and specifying lifting anchors, it is imperative to ensure that the load is distributed as evenly as possible when deciding on the number of anchors and their specification.

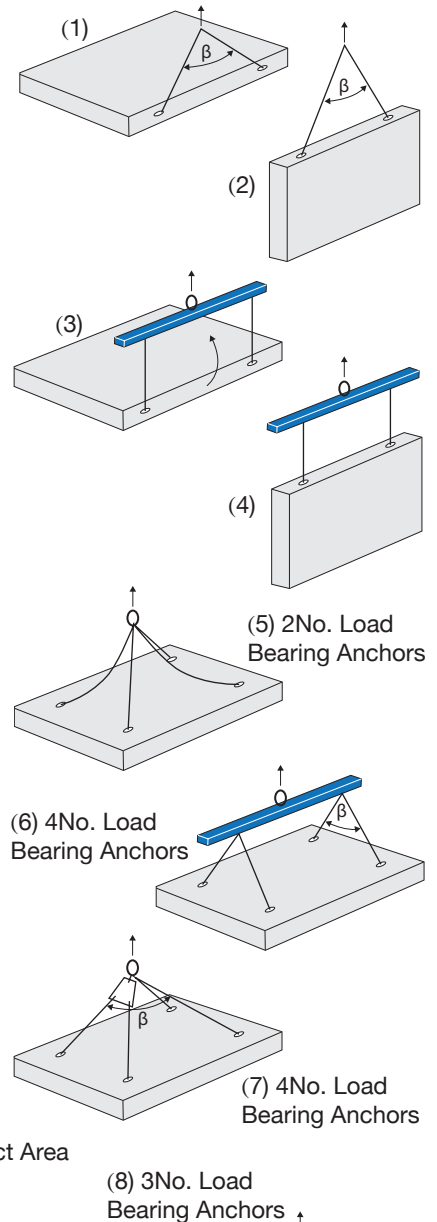
Dependent on the lifting equipment used, the anchors may be subjected to parallel and transverse shear load (1), combined tension and parallel shear loads (2), transverse shear loads (3) or axial tensile loads (4).

It is essential to ensure an even load distribution over each load bearing anchor. It is not possible to calculate anchor loads for four anchors in panels (5) as the exact distribution of load cannot be guaranteed, resulting in two anchors taking the initial load and a third taking the counterbalance. The use of a spreader beam (6) or load equalising chain rig (7) will ensure four equally loadbearing anchors. In situations where four anchor points cannot be established as equally load bearing, design for two load bearing anchors.

A three point lift as shown in (8) will always provide an even distribution of load providing the anchors are spaced evenly and correctly around the centre of gravity.

The forces acting on lifting inserts in a precast unit should be calculated for all relevant situations taking into account the product properties, position of the inserts, condition of the formwork, lifting equipment, number of inserts, chains and lengths thereof determining sling angle (β).

β = Internal Chain Sling Angle



Anchor Load Calculation

When designing the lifting for a precast unit, all the forces that the unit and the anchors will be subjected to at all points of handling must be considered. When de-moulding, the adhesion to the mould must be calculated along with the factors for both the lifting apparatus and the chain sling angle.

Once the unit has been de-moulded, the nature of its handling must then be calculated in the factory environment and also for the construction site. A separate calculation at each handling stage should be provided to ensure that the specified anchors have sufficient capacity for the greatest load point from de-moulding to installation. Units that require pitching from flat to upright must also be considered and a separate calculation provided for this section of handling.

The concrete strength in this manual refers to cube strength (fcu). To convert to cylinder strength:- $f_{ck} / 0.8 = f_{cu}$ approx.

Adhesion Factor

Adhesion and form friction will occur when a precast unit is removed from the formwork. The combined effect of adhesion and form friction should be assumed as follows, dependent on the type of formwork:

Oiled steel mould, oiled melamine coated plywood	=	1kN/m ²
Oiled, varnished wooden mould with planed boards	=	2kN/m ²
Oiled rough wooden mould	=	3kN/m ²
Adhesion	=	Adhesion Factor x Mould Contact Area

For de-moulding loads, the force (F) is calculated as follows:

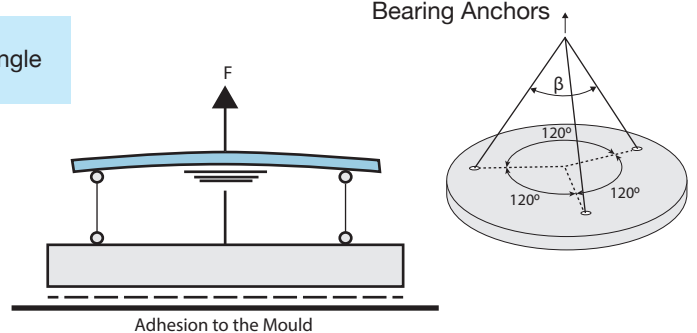
$$F = \frac{(\text{Deadweight} + \text{Adhesion}) \times \text{Crane Factor}}{\text{No. of Loadbearing Anchors}} \times \text{Chain Sling Angle}$$

In the event that the sling angles differ on the individual lifting points of a unit, then the factors and subsequent load at each should be calculated.

Higher adhesion to the mould must be considered for double T-slabs and coffered units. A multiple of the mass is used to calculate this as follows:

Double T-beams	=	2 x Deadweight
Ribbed Slabs	=	3 x Deadweight
Coffer units	=	4 x Deadweight

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

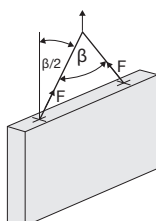


Chain Sling Angles

When lifting with chain slings in a triangular pattern, the forces the anchors are subjected to are dependent on the angle of the chains. The higher the sling angle, the greater the load applied to the insert. The factors to consider are as follows:

β = Factor	β = Factor
0° = 1.00	15° = 1.01
30° = 1.04	45° = 1.08
60° = 1.16	75° = 1.26
90° = 1.41	≥120° = 2.00

Please note:
The preferred lifting angle should be ≤ 60°.



Crane Factor

During lifting and handling, the precast units are subject to dynamic actions. The magnitude of the dynamic actions depends on the machinery being used and chain angles applied. Dynamic effects, or crane factor, must be taken into account when specifying anchors.

The crane factor for all areas of handling can have a significant effect on the loads that a unit can be subjected to. When handling units with precision lifting equipment such as gantry cranes, the effect is relatively small compared to transportation of units with mobile lifting apparatus over uneven terrain.

Other dynamic influences not covered by these below should be based on special provisions or engineer's judgement.

De-Mould	=	x 1.1	Mobile crane	=	x 1.4
Pitching	=	x 1.3	Lifting and moving over even ground	=	x 1.65
Tower or gantry crane	=	x 1.2	Lifting and moving over uneven ground	=	x 2.0

For determining the force (F) in lifting situations, the following formula should be used:

$$F = \frac{(\text{Deadweight} \times \text{Crane Factor})}{\text{No. of Loadbearing Anchors}} \times \text{Chain Sling Angle}$$

Example

A precast wall unit that is 4m x 2m x 0.3m, based on a cube weight of 25kN/m³ will weigh as follows:

Deadweight	=	(4 x 2 x 0.3) x 25kN/m ³	=	60kN
Adhesion to the mould	=	4 x 2 x 2kN/m ²	=	16kN

De-moulded with a gantry crane, chain sling angle of $\beta=30$ degrees at all times, three load bearing anchors, planed wooden mould. Lifted with a stationary mobile crane at the construction site.

De-mould Load	=	((60kN + 16kN) x 1.1) x 1.04 / 3	=	28.98kN
Factory Transport Load (flat)	=	((60kN x 1.2) x 1.04) / 3	=	24.96kN
Pitching	=	((60kN / 2) x 1.3) x 1.04 / 2	=	20.28kN

The unit's deadweight is halved when pitching from flat to upright.

Site Lifting Load	=	((60kN x 1.4) x 1.04) / 2	=	43.68kN
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The above example assumes anchor positions that are evenly spaced around the centre of gravity, with the chain hook directly above it. In the case where this is not possible as shown opposite, the following formula should be used:

$$F_1 = \frac{F_{\text{tot}} \times b}{(a + b)}$$

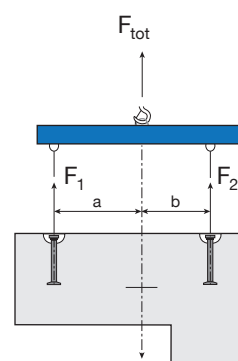
$$F_2 = \frac{F_{\text{tot}} \times a}{(a + b)}$$

It is essential that the details in this literature are made available to all relevant staff and that they are aware of, and understand the installation instructions and safety regulations.

RFA-Tech offers a full technical support service, including design calculations and on site pullout testing.

This literature is designed as guidance for professional engineers and precast manufacturers.

Please contact our sales office for further details.



RFA-TECH CAPSTAN ANCHOR SYSTEM

The Capstan Anchors are a safe, simple and effective system for lifting most types of precast concrete units. The anchors are hot drop forged from high grade steel and, provided the anchor is specified and installed correctly, provide safe and secure lifting, turning and transportation of units. Anchors are available in black, zinc plated, galvanised, 304 and 316 stainless steel.

The system consists of three main components, the anchor (also known as pins, spherical head or modform), a recess former and a lifting attachment known as a shackle that links the anchor to the crane hook. They are produced in load groups from 1.3t to 32.0t and there is a length and material to suit almost all precast units.

Each anchor is stamped with the manufacturers identification mark, safe working load rating of the anchor, the batch number and CE mark. Lifting Shackles are also marked with the load group, CE mark along with the manufacturing date stamp and an individual index number for full traceability of the system. All products are rigorously tested, inspected and are supplied with Declarations of Conformity with each order along with safe working instructions where applicable.

The design of the system prevents the mismatch of load groups, as only the appropriate shackle will fit the anchor it is intended to use.

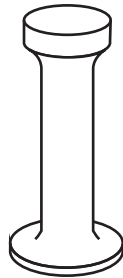
Capstan Anchors are designed for de-moulding, pitching, transport and site fixing. It is likely that there will be numerous lifting operations from production to installation, so the handling at each point should be carefully considered at each stage, and an appropriate load group and length should be selected. These anchors should not be used for repeated lifting applications over a prolonged period of time. If pitching of units is required with Capstan Anchors, please contact RFA-Tech for technical assistance.

Anchor Summary

Anchor Types

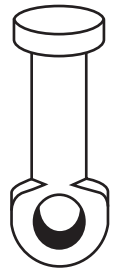
Capstan Anchor

1.3t–32.0t load groups and are suitable for large units such as staircases, slabs, wall units, beams and pipes.



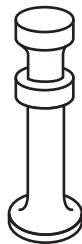
Capstan Eye Anchor

1.3t–20.0t load groups and use with a reinforcement tail in thin walled units.



Double Head Capstan Anchor

1.3t–5.0t load groups and have been developed for automatic installation in concrete pipe manufacture. These have also proved very effective for Hollowcore Flooring production.



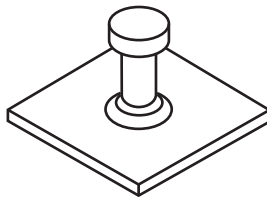
Capstan Rod Anchor

2.5t–15.0t load groups and are suitable for very thin precast units.



Capstan Plate Anchor

2.5t–10.0t load groups with a welded plate for production of thin slabs and de-moulding horizontally cast wall panels.



Capstan Anchor Accessories

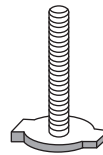
Capstan Rubber Recess Former

Available in 1.3t–32.0t load groups. The former creates a void in the precast to accept the Shackle and to allow rotation through 360° which is particularly useful for pitching / turning.



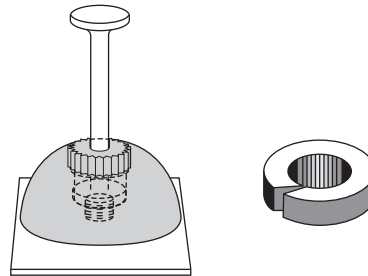
Capstan Fixing Screw

Available in 1.3t–32.0t load groups and are used for attaching the former through the mould, or for suspending below jigs for vertical casting. The screw holds the anchor tightly to the formwork when fastened with a washer and nut.



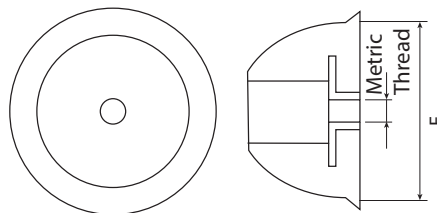
Capstan Magnetic Recess Former

Available in 1.3t–10.0t load groups and are used for attaching the anchor to steel moulds before casting. The former creates a void in the precast to accept the Shackle and to allow lifting through 360°. This requires a rubber sleeve around the anchor to prevent concrete ingress, and is available in a variety of adhesions.



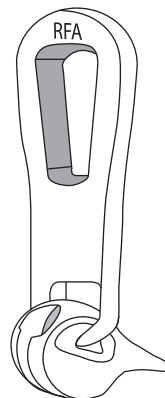
Doublehead Anchor Former

Available in 1.3t–5.0t load groups and are used for attaching the anchor to the mould, or for floating applications. This former is specific to the Doublehead Anchor and creates a void in the precast to accept the shackle and to allow lifting through 360°. The second head of the anchor seals the recess in the former to prevent concrete ingress.



Capstan Lifting Shackle

Available in 1.3t–32.0t load groups and are used for lifting and turning concrete units with corresponding anchors cast in. The shackle head surrounds the anchor and can rotate through 360°. Only the correct shackle for the anchor load group will fit.



ANCHOR USE AND SPECIFICATION CONSIDERATIONS

Anchor Operation

The Capstan Anchor works by the distribution of load into the concrete via the tapered foot as shown below, this provides high load values with short embedment in the concrete. The forces can even be transferred into thin walled panels and safely lifted with the correct reinforcement.

All anchors and lifting shackles must be designed, calculated and installed, according to the instruction in this technical manual. The Capstan System is only suitable for production lifting, storing and erecting precast units. For longer term use please consult RFA-Tech.

The lifting shackles must be in their secure position during the lifting operation, i.e. with the weighted lip facing towards the centre of the load in line with the chains as shown in (3).

It is essential to specify the correct length of anchor relevant to the unit being lifted and the compressive strength of the concrete at the time of lifting. Longer anchors should be used in low concrete strength lifts and in narrow units.

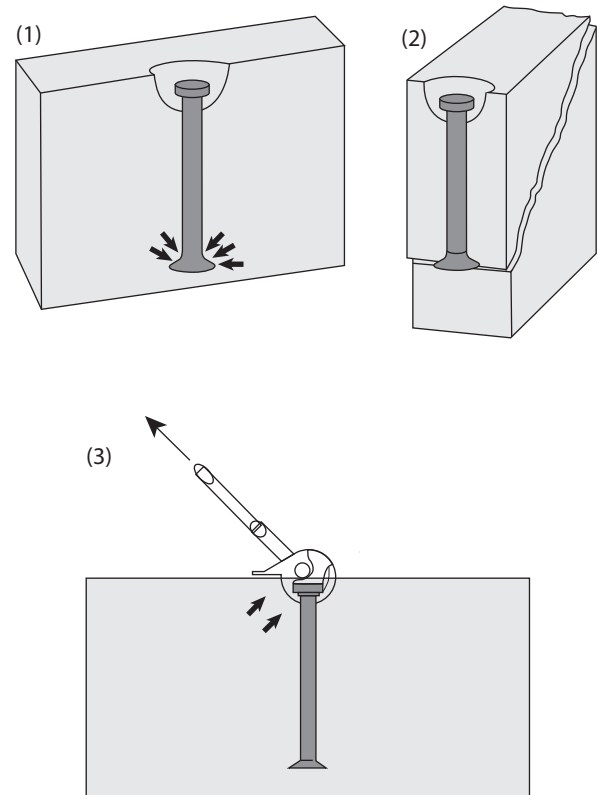
The load is transferred into the concrete via cone resistance through the foot of the anchor (1). In the correct environment very high loads are permissible with low anchor embedment. The failure mode of concrete under load is cone failure as shown in (2).

Even in thin wall type units, the load can be distributed into the concrete in a gradual manner as a larger area of concrete is activated under load.

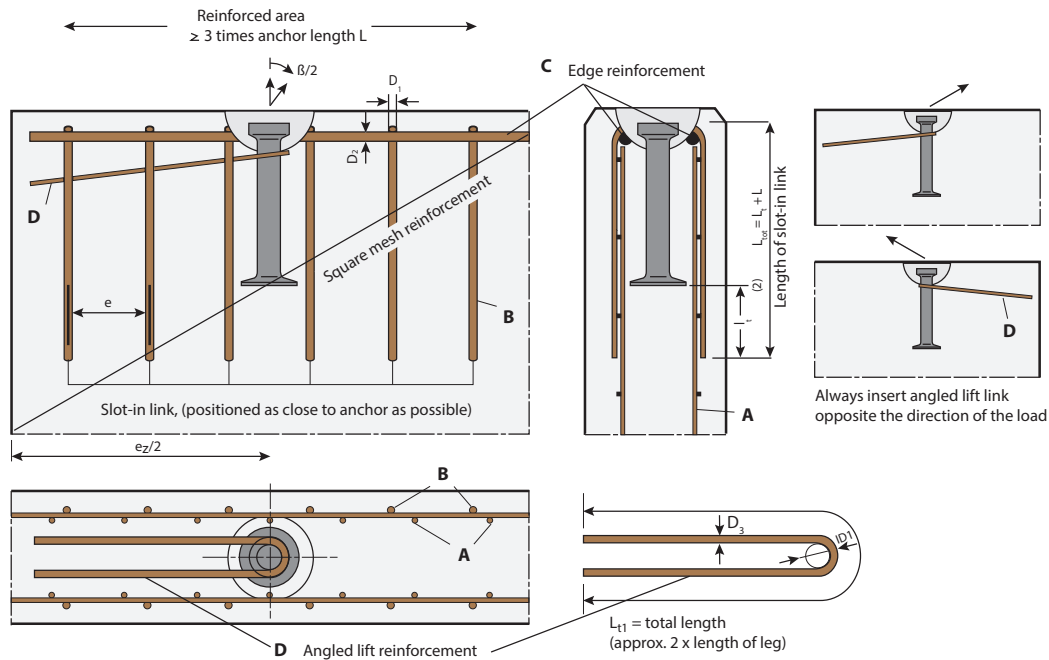
The Capstan Anchor is installed using a recess former that holds the anchor securely in place during casting. This is removed once the concrete is cured to leave a recess that seats the corresponding shackle.

The incorrect use of parts of different load groups is impossible. The shackle sits tightly against the concrete during angled lift and therefore transfers the horizontal load directly into the concrete. For this reason, no reduction of loadbearing capacity is required for large units. Additional reinforcement for this application is not necessarily required. Additional reinforcement must be installed for angled lift in thin walled units as detailed on page 9.

It is essential that consideration is taken to ensure that the anchors are equally positioned around the centre of gravity, and that loads are distributed evenly between each anchor. Where the unit's design does not permit this, then the load per anchor should be calculated based on the distribution either side of the centre of gravity, and the anchors specified according to the required loads.



INSTALLATION IN WALLS AND BEAMS— ADDITIONAL REINFORCEMENT REQUIREMENTS



The angled lift reinforcement must be placed in direct contact with the shank of the anchor and as close as possible under the recess former.

For this reason the bend radius must be tight, i.e. the normal bend radius should be ignored as this must be tight.

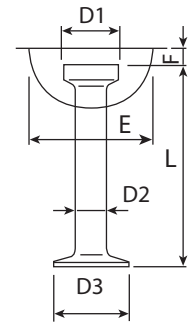
The unit's main reinforcement may be sufficient to ensure the anchors capacity providing it is equal to, or greater than that detailed below.

Reinforcement in Walls

Load Group	(1) Square Mesh Reinforcement A	Slot-in Link B (1) (2) (3)						Edge (1) Reinforcement C Both Sides	(4) (5) Angled Lift Stirrup D – High Yield Bar			
		For Axial Lift $\leq 30^\circ$			For Axial Lift $> 30^\circ$				D_2 mm	D_3 mm	ID1 mm	L_{tl} mm
		Number of Bars	D_1 mm	L_t mm	Number of bars	D_1 mm	L_t mm					
1.3	2 x A98	2	H6	310	2	H6	460	H10	H8	25	810	
2.5	2 x A142	2	H8	620	4	H8	620	H10	H10	25	1510	
4.0	2 x A142	2	H8	620	4	H8	620	H10	H12	30	1610	
5.0	2 x A193	2	H10	730	4	H10	730	H12	H16	35	2010	
7.5	2 x A193	4	H10	730	6	H10	730	H12	H16	40	2310	
10.0	2 x A193	4	H10	730	8	H10	730	H16	H20	50	2610	
15.0	2 x A252	4	H12	810	6	H12	1010	H16	H25	80	3010	
20.0	2 x A393	6	H12	1010	10	H12	1010	H16	2 x H25	80	3010	
32.0	2 x H12 @ 200mm Centres	8	H12	1010	10	H16	1110	H16	2 x H25	80	3010	

- (1) With very thin panels ($2 \times e_p \leq 75$) the square mesh can be taken together in one layer (i.e. 2 x A142 will be 1 no A252 centrally). The slot-in links may be placed skewed, but ensure that the edge reinforcement is installed either side of the anchor.
- (2) The length of the link (L_{tot}) = length of the anchor (L) + the dimension in the chart above (L_t)
- (3) The slot-in links should be spaced out 2.5 times the anchor length either side, and the first must be as close as can be positioned next to the former.
- (4) Angled lift reinforcement is only needed if $\beta/2 > 30^\circ$. Angled lift reinforcement may not be required if the edge distance is greater (see the load tables).
- (5) Should the length of the precast unit prevent the angled lift reinforcement being installed as a straight bar, then a bend to return up to 40% of the bar vertically can be made.

INSTALLATION IN WALLS AND BEAMS



Anchor Sizes

Load Group t	Length L mm	Part Code Black	Part Code Galv	D1 mm	D2 mm	D3 mm	E mm	F mm
1.3	85	1.3A085	1.3A085G	19	10	25	60	10
1.3	120	1.3A120	1.3A120G	19	10	25	60	10
1.3	240	1.3A240	1.3A240G	19	10	25	60	10
2.5	120	2.5A120	2.5A120G	26	14	35	74	11
2.5	170	2.5A170	2.5A170G	26	14	35	74	11
2.5	280	2.5A280	2.5A280G	26	14	35	74	11
5.0	240	5.0A240	5.0A240G	36	20	50	94	15
5.0	340	5.0A340	5.0A340G	36	20	50	94	15
5.0	480	5.0A480	5.0A480G	36	20	50	94	15
7.5	200	7.5A200	7.5A200G	46	24	60	118	15
7.5	300	7.5A300	7.5A300G	46	24	60	118	15
7.5	540	7.5A540	7.5A540G	46	24	60	118	15
10.0	170	10A170	10A170G	46	28	70	118	15
10.0	340	10A340	10A340G	46	28	70	118	15
10.0	680	10A680	10A680G	46	28	70	118	15
15.0	300	15A300	15A300G	69	34	85	160	15
15.0	400	15A400	15A400G	69	34	85	160	15
15.0	840	15A840	15A840G	69	34	85	160	15
20.0	340	20A340	20A340G	69	38	98	160	15
20.0	500	20A500	20A500G	69	38	98	160	15
20.0	1000	20A1000	20A1000G	69	38	98	160	15
32.0	320	32A320	32A320G	88	50	135	214	23
32.0	700	32A700	32A700G	88	50	135	214	23
32.0	1200	32A1200	32A1200G	88	50	135	214	23

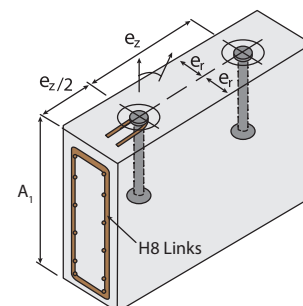
The reinforcement in the precast unit will be suitable for Capstan Anchors as long as it is equal to, or greater than that detailed on page 9. The load is distributed from the foot in to the concrete and steel which is designed to protect the cone. Additional reinforcement to ensure safe lifting of the unit as a whole, must be specified by the design engineer.

Units can be pitched and turned using Capstan Anchors with special reinforcement, but this is not suited to all types of products. Please contact RFA-Tech for technical assistance.

LOADING CAPACITIES FOR WALLS AND BEAMS WITH NOMINAL REINFORCEMENT

Required reinforcement mesh A and reinforcement only D with angled lift (reinforcement see page 9)

Note:
preferred $\beta = 60^\circ$
avoid $\beta = 90^\circ$ as far as possible

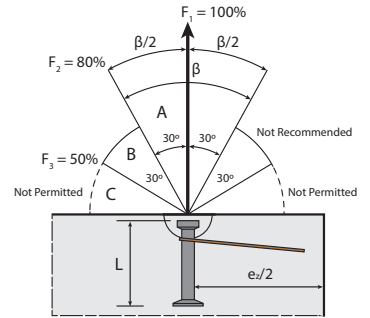


Load capacities with nominal reinforcement A and D only									
Load Group t	Part Code Black	Length of Anchor L mm	Minimum Height of Walls A ₁ mm	Wall Thickness or Wall Width 2 x e _z mm	Load capacity (kN) at concrete strength of				Distance Between Anchors e _z mm
					Axial Lift up to 60° [β]	Axial Lift up to 90° [β]	Axial Lift and Angled Lift up to 90° [β]	Axial Lift and Angled Lift up to 90° [β]	
					15N/mm ²	15N/mm ²	25N/mm ²	35N/mm ²	
1.3	1.3A085	85	185	100	12.1	9.7	13.0	13.0	275
				120	13.0	11.1	13.0	13.0	
				140	13.0	12.4	13.0	13.0	
	1.3A120	120	255	80	13.0	10.6	13.0	13.0	380
				100	13.0	12.6	13.0	13.0	
				120	13.0	13.0	13.0	13.0	
1.3A240	240	495	60	9.8	9.8	12.6	13.0	740	
			80	13.0	13.0	13.0	13.0		
			100	13.0	13.0	13.0	13.0		
2.5	2.5A120	120	253	120	18.0	14.4	23.2	25.0	380
				140	20.2	16.1	25.0	25.0	
				160	22.3	17.8	25.0	25.0	
	2.5A170	170	353	100	20.6	16.4	25.0	25.0	530
				120	23.6	19.0	25.0	25.0	
				140	25.0	21.2	25.0	25.0	
2.5A280	280	573	80	18.3	18.3	23.7	25.0	860	
			100	22.9	22.9	25.0	25.0		
			120	25.0	25.0	25.0	25.0		
5.0	5.0A240	240	495	200	45.6	36.4	50.0	50.0	740
				220	49.0	39.1	50.0	50.0	
				240	50.0	41.8	50.0	50.0	
	5.0A340	340	695	160	50.0	40.5	50.0	50.0	1040
				180	50.0	44.3	50.0	50.0	
				200	50.0	47.9	50.0	50.0	
5.0A480	480	975	140	46.0	46.0	50.0	50.0	1460	
			160	50.0	50.0	50.0	50.0		
			180	50.0	50.0	50.0	50.0		
7.5	7.5A200	200	415	240	45.0	35.9	58.1	68.7	615
				260	47.7	38.2	61.7	73.0	
				280	50.5	40.4	65.2	75.0	
	7.5A300	300	615	200	54.0	43.2	69.8	75.0	915
				220	58.0	46.4	75.0	75.0	
				240	62.1	49.6	75.0	75.0	
7.5A540	540	1095	160	63.1	58.3	75.0	75.0	1635	
			180	71.0	63.7	75.0	75.0		
			200	75.0	69.0	75.0	75.0		

(A) Lifting without angle lift reinforcement only allowed when:
 Concrete Strength $\geq 15\text{N/mm}^2 + 3$ times min. thickness of unit
 Concrete Strength $\geq 25\text{N/mm}^2 + 2.5$ times min. thickness of unit
 Concrete Strength $\geq 35\text{N/mm}^2 + 2$ times min. thickness of unit
 (min thickness of unit = $2 \times e$)

(B) Where concrete strength $\geq 25\text{N/mm}^2$ F_2 can be taken as 100%

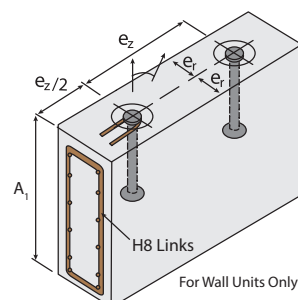
(C) Angle of $\beta/2 \geq 120^\circ$ due to chain or cable spread angle is not permitted.



Load capacities with nominal reinforcement A and D only										
Load Group	Part Code Black	Length of Anchor L mm	Minimum Height of Walls A_1 mm	Wall Thickness or beams Width Wall Thickness or Walls Width $2 \times e_r$ mm	Load capacity (kN) at concrete strength of				Distance Between Anchors	
					Axial Lift up to 60° [β]	Axial Lift up to 90° [β]	Axial Lift and Angled Lift up to 90° [β]	Axial Lift and Angled Lift up to 90° [β]	e_2 mm	mm
					15N/mm^2	15N/mm^2	25N/mm^2	35N/mm^2		
10.0	10A170	170	345	300	46.3	37.1	59.9	70.8	525	
				350	52.0	41.6	67.2	79.5		
				400	57.5	46.0	74.3	79.9		
	10A340	340	685	280	76.5	61.2	98.8	100.0	1035	
				300	80.6	64.4	100.0	100.0		
				320	84.6	67.6	100.0	100.0		
	10A680	680	1365	160	73.6	69.9	95.1	100.0	2055	
				180	83.0	76.4	100.0	100.0		
				200	92.1	82.7	100.0	100.0		
15.0	15A300	300	605	350	81.2	64.9	104.8	124.1	905	
				400	89.4	71.8	115.9	137.1		
				500	106.1	84.9	137.0	150.0		
	15A400	400	805	350	102.4	81.9	132.2	150.0	1205	
				400	113.1	90.5	146.1	150.0		
				450	123.6	89.9	150.0	150.0		
	15A840	840	1685	300	150.0	132.4	150.0	150.0	2525	
				340	150.0	145.4	150.0	150.0		
				380	150.0	150.0	150.0	150.0		
20.0	20A340	340	675	500	116.5	93.2	150.5	178.1	1015	
				750	158.0	126.4	200.0	200.0		
				1000	196.1	156.8	200.0	200.0		
	20A500	500	995	400	134.7	107.8	174.0	200.0	1495	
				500	159.3	127.4	200.0	200.0		
				600	182.7	146.1	200.0	200.0		
	20A1000	1000	1995	240	154.8	128.5	199.8	200.0	3005	
				300	189.9	151.9	200.0	200.0		
				330	200.0	163.1	200.0	200.0		
32.0	32A320	320	635	600	126.6	101.2	163.4	193.4	945	
				800	157.1	125.6	202.8	240.0		
				1200	177.1	141.7	228.7	270.6		
	32A700	700	1395	500	208.5	166.8	269.3	318.6	2085	
				600	239.1	191.3	308.7	320.0		
				750	282.7	226.1	320.0	320.0		
	32A1200	1200	2395	400	272.4	217.9	320.0	320.0	3585	
				450	297.6	238.1	320.0	320.0		
				500	320.0	257.7	320.0	320.0		

LOADING CAPACITIES FOR WALLS AND BEAMS WITH FULLY ACTIVATED REINFORCEMENT CAGE

Note: These units require reinforcement A, B, C, reinforcement D with an angled lift (reinforcement see page 9)

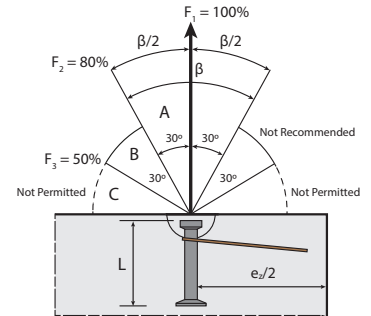


Load capacity of anchors in wall units with a fully activated reinforcement cage

Load Group	Part Code Black	Length of Anchor L mm	Wall Thickness or Walls Width $2 \times e_x$ mm	Load Capacity (kN) at Concrete Strength of				Distance Between Anchors e_z mm
				Axial Lift up to 60° [β] 15N/mm ²	Axial Lift up to 90° [β] 15N/mm ²	Axial Lift and Angled Lift up to 90° [β] 25N/mm ²	Axial Lift and Angled Lift up to 90° [β] 35N/mm ²	
1.3	1.3A120	120	60	9.8	9.8	12.7	13.0	380
			80	13.0	13.0	13.0	13.0	
			100	13.0	13.0	13.0	13.0	
	1.3A240	240	60	9.8	9.8	12.7	13.0	740
			80	13.0	13.0	13.0	13.0	
			100	13.0	13.0	13.0	13.0	
2.5	2.5A170	170	80	18.3	18.3	23.7	25.0	530
			100	22.9	22.9	25.0	25.0	
			120	25.0	25.0	25.0	25.0	
	2.5A280	280	80	18.3	18.3	23.7	25.0	860
			100	22.9	22.9	25.0	25.0	
			120	25.0	25.0	25.0	25.0	
5.0	5.0A240	240	160	50.0	45.1	50.0	50.0	740
			180	50.0	47.9	50.0	50.0	
			200	50.0	50.0	50.0	50.0	
	5.0A340	340	120	39.4	39.4	50.0	50.0	1040
			140	46.0	46.0	50.0	50.0	
			160	50.0	50.0	50.0	50.0	
	5.0A480	480	100	32.8	32.8	42.4	50.0	1460
			120	39.4	39.4	50.0	50.0	
			140	46.0	46.0	50.0	50.0	
7.5	7.5A300	300	160	63.1	56.5	75.0	75.0	915
			180	71.0	59.9	75.0	75.0	
			200	75.0	63.1	75.0	75.0	
	7.5A540	540	140	55.2	55.2	71.3	75.0	1635
			160	63.1	63.1	75.0	75.0	
			180	71.0	71.0	75.0	75.0	

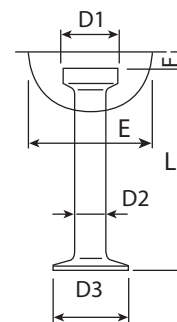
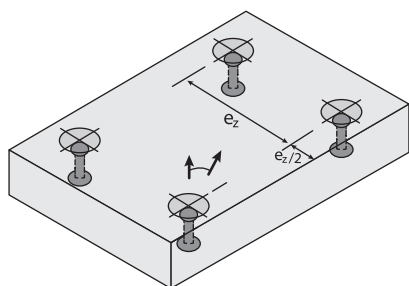
(A) Lifting without angle lift reinforcement only allowed when:
 Concrete Strength $\geq 15\text{N/mm}^2 + 3$ times min. thickness of unit
 Concrete Strength $\geq 25\text{N/mm}^2 + 2.5$ times min. thickness of unit
 Concrete Strength $\geq 35\text{N/mm}^2 + 2$ times min. thickness of unit
 (min thickness of unit = $2 \times e_c$)

(B) Where concrete strength $\geq 25\text{N/mm}^2$ F_2 can be taken as 100%
 (C) Angle of $\beta/2 \geq 120^\circ$ due to chain or cable spread angle is not permitted.



Load Group	Part Code Black	Length of Anchor L mm	Wall Thickness or Walls Width $2 \times e_c$ mm	Load Capacity (kN) at Concrete Strength of				Distance Between Anchors e_z mm
				Axial Lift up to 60° [β] 15N/mm^2	Axial Lift up to 90° [β] 15N/mm^2	Axial Lift and Angled Lift up to 90° [β] 25N/mm^2	Axial Lift and Angled Lift up to 90° [β] 35N/mm^2	
10.0	10A340	340	200	89.4	71.5	100.0	100.0	1035
			240	97.9	78.3	100.0	100.0	
			280	100.0	84.6	100.0	100.0	
	10A680	680	160	73.6	73.6	95.1	100.0	2055
			180	82.9	82.9	100.0	100.0	
			200	92.1	92.1	100.0	100.0	
15.0	15A400	400	300	128.8	103.0	150.0	150.0	1205
			400	148.8	119.0	150.0	150.0	
			500	150.0	133.0	150.0	150.0	
	15A840	840	200	111.8	111.8	144.4	150.0	2525
			220	123.0	123.0	150.0	150.0	
			240	134.1	134.1	150.0	150.0	
20.0	20A500	500	300	162.0	129.6	200.0	200.0	1495
			400	175.0	140.0	200.0	200.0	
			500	187.1	149.6	200.0	200.0	
			600	200.0	183.3	200.0	200.0	
	20A1000	1000	240	154.8	154.8	199.8	200.0	3005
			260	167.7	167.7	200.0	200.0	
32.0	32A700	700	450	282.5	226.0	320.0	320.0	2085
			550	312.4	249.9	320.0	320.0	
			650	320.0	271.7	320.0	320.0	
	32A1200	1200	300	266.6	266.6	320.0	320.0	3585
			350	311.0	311.0	320.0	320.0	
			400	320.0	320.0	320.0	320.0	

INSTALLATION IN SLAB UNITS



Load Group t	Length L mm	Part Code Black	Part Code Galv	D1	D2	D3	E	F
1.3	40	1.3A040	1.3A040G	19	10	25	60	10
1.3	50	1.3A050	1.3A050G	19	10	25	60	10
1.3	65	1.3A065	1.3A065G	19	10	25	60	10
1.3	85	1.3A085	1.3A085G	19	10	25	60	10
1.3	120	1.3A120	1.3A120G	19	10	25	60	10
2.5	55	2.5A055	2.5A055G	26	14	35	74	11
2.5	65	2.5A065	2.5A065G	26	14	35	74	11
2.5	85	2.5A085	2.5A085G	26	14	35	74	11
2.5	120	2.5A120	2.5A120G	26	14	35	74	11
2.5	140	2.5A140	2.5A140G	26	14	35	74	11
2.5	170	2.5A170	2.5A170G	26	14	35	74	11
5.0	85	5.0A085	5.0A085G	36	20	50	94	15
5.0	95	5.0A095	5.0A095G	36	20	50	94	15
5.0	120	5.0A120	5.0A120G	36	20	50	94	15
5.0	180	5.0A180	5.0A180G	36	20	50	94	15
5.0	240	5.0A240	5.0A240G	36	20	50	94	15
7.5	100	7.5A100	7.5A100G	46	24	60	118	15
7.5	120	7.5A120	7.5A120G	46	24	60	118	15
7.5	140	7.5A140	7.5A140G	46	24	60	118	15
7.5	165	7.5A165	7.5A165G	46	24	60	118	15
7.5	200	7.5A200	7.5A200G	46	24	60	118	15
7.5	300	7.5A300	7.5A300G	46	24	60	118	15
10.0	120	10A120	10A120G	46	28	70	118	15
10.0	170	10A170	10A170G	46	28	70	118	15
10.0	340	10A340	10A340G	46	28	70	118	15
15.0	300	15A300	15A300G	69	34	85	160	15
15.0	400	15A400	15A400G	69	34	85	160	15
20.0	200	20A200	20A200G	69	38	98	160	15
20.0	240	20A240	20A240G	69	38	98	160	15
20.0	250	20A250	20A250G	69	38	98	160	15
20.0	340	20A340	20A340G	69	38	98	160	15
20.0	500	20A500	20A500G	69	38	98	160	15
32.0	200	32A200	32A200G	88	50	135	214	23
32.0	250	32A250	32A250G	88	50	135	214	23
32.0	280	32A280	32A280G	88	50	135	214	23
32.0	320	32A320	32A320G	88	50	135	214	23

LOADING CAPACITIES FOR SLAB UNITS

Load capacity of Capstan Anchors in slabs with any direction of lift

Load Group t	Part Code Black	Length of Anchor L mm	Load Capacity (kN) at Minimal Slab Thickness Concrete Strength	Load Capacity (kN) at Minimal Slab Thickness Concrete Strength			Load Capacity (kN) at Normal Slab Thickness Concrete Strength	Load Capacity (kN) at Normal Slab Thickness Concrete Strength			Distance Between Anchor e ₂ mm
				15 N/mm ² #	25 N/mm ²	35 N/mm ²		15 N/mm ² #	25 N/mm ²	35 N/mm ²	
1.3	1.3A040	40	80	7.7	9.9	11.8	95	8.7	11.2	13.0	140
	1.3A050	50	90	10.0	13.0	13.0	115	11.9	13.0	13.0	170
	1.3A065	65	105	13.0	13.0	13.0	145	13.0	13.0	13.0	215
	1.3A085	85	125	13.0	13.0	13.0	185	13.0	13.0	13.0	275
2.5	1.3A120	120	160	13.0	13.0	13.0	255	13.0	13.0	13.0	380
	2.5A055	55	95	11.1	14.4	17.0	125	13.2	17.1	20.3	185
	2.5A065	65	105	13.7	17.7	21.0	145	16.9	21.9	25.0	215
	2.5A085	85	125	19.4	25.0	25.0	185	25.0	25.0	25.0	270
	2.5A120	120	160	25.0	25.0	25.0	255	25.0	25.0	25.0	380
5.0	2.5A170	170	210	25.0	25.0	25.0	355	25.0	25.0	25.0	525
	5.0A085	85	130	20.0	25.9	30.7	185	25.6	33.0	39.1	275
	5.0A095	95	140	23.2	29.9	35.4	205	30.1	38.9	46.1	305
	5.0A120	120	165	31.6	40.9	48.4	255	42.6	50.0	50.0	380
	5.0A180	180	225	50.0	50.0	50.0	375	50.0	50.0	50.0	560
7.5	5.0A240	240	285	50.0	50.0	50.0	495	50.0	50.0	50.0	740
	7.5A100	100	145	24.4	31.5	37.3	210	31.5	40.8	48.2	314
	7.5A120	120	165	31.2	40.3	47.7	250	41.6	53.7	63.5	375
	7.5A140	140	185	38.5	49.8	58.9	290	52.5	67.8	75.0	435
	7.5A165	165	210	48.5	62.6	74.1	340	67.5	75.0	75.0	510
	7.5A200	200	245	63.7	75.0	75.0	410	75.0	75.0	75.0	615
	7.5A300	300	345	75.0	75.0	75.0	610	75.0	75.0	75.0	915
10.0	10A115	115	160	29.0	37.4	44.3	235	37.9	49.0	58.0	355
	10A135	135	180	36.2	46.7	55.3	275	48.6	62.8	74.3	415
	10A150	150	195	41.9	54.2	64.1	305	57.2	73.8	87.4	460
	10A170	170	215	50.1	64.7	76.5	345	69.3	89.5	100.0	520
	10A200	200	245	63.1	81.6	96.5	405	89.1	100.0	100.0	610
	10A250	250	295	87.2	100.0	100.0	505	100.0	100.0	100.0	760
	10A340	340	385	100.0	100.0	100.0	685	100.0	100.0	100.0	1030
	15A140	140	185	37.4	48.3	57.1	280	49.7	64.2	76.0	420
	15A165	165	210	47.2	61.0	72.2	330	64.4	83.1	98.4	495
	15A200	200	245	62.3	80.5	95.2	400	87.1	112.4	133.0	600
15.0	15A300	300	345	112.9	145.7	150.0	600	150.0	150.0	150.0	900
	15A400	400	445	150.0	150.0	150.0	800	150.0	150.0	150.0	1200
	20A200	200	245	61.5	79.4	94.0	395	85.0	109.8	129.9	590
	20A240	240	285	80.4	103.8	122.8	475	113.6	146.6	173.5	710
	20A250	250	295	85.4	110.2	130.4	495	121.1	156.4	185.1	740
	20A300	300	345	111.9	144.4	170.9	595	161.6	200.0	200.0	890
	20A340	340	385	134.8	174.1	200.0	675	196.8	200.0	200.0	1010
20.0	20A500	500	545	200.0	200.0	200.0	995	200.0	200.0	200.0	1490
	32A200	200	253	62.3	80.4	95.2	390	83.7	108.0	127.8	585
	32A250	250	303	86.3	111.4	131.9	490	119.6	154.4	182.8	735
	32A280	280	333	102.0	131.7	155.8	550	143.3	185.0	218.9	825
	32A320	320	373	124.3	160.5	189.9	630	177.1	228.7	270.6	945

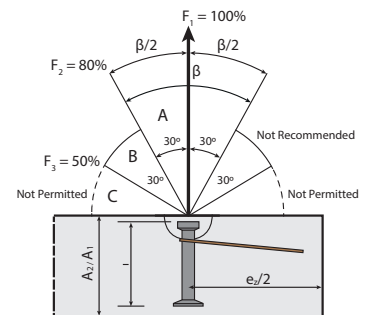
- Main reinforcement for the slab as a whole must be designed by others
- A₁ Concrete cover at the foot of the anchor 30mm
- A₂ Concrete thickness, twice the effective embedment of the anchor
- Thinner slabs are possible provided the foot of the anchor has suitable corrosion protection - Contact RFA-Tech
- Between A₁ and A₂ the load capacity can be found by linear interpolation
- # At concrete strength 15N/mm² the load capacity for angled lift with β/2 > 30° is only 80%

The minimum reinforcement mesh is:
 A142 squared up to 2.5t
 A193 squared up to 7.5t
 A252 squared up to 15.0t
 A393 squared for 20.0t
 H12 @ 200mm Centres squared for 32.0t

(A) Lifting without angle lift reinforcement only allowed when:
 Concrete Strength ≥ 15N/mm² + 3 times min. thickness of unit
 Concrete Strength ≥ 25N/mm² + 2.5 times min. thickness of unit
 Concrete Strength ≥ 35N/mm² + 2 times min. thickness of unit
 (min thickness of unit = 2 x e)

(B) Where concrete strength ≥ 25N/mm² F₂ can be taken as 100%
 (C) Angle of β/2 ≥ 120° due to chain or cable spread angle is not permitted.

Reinforcement D is only required with an angled lift (reinforcement see page 9)



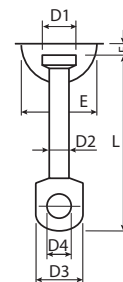
RFA-TECH CAPSTAN EYE ANCHORS

The Capstan Eye Anchor is for use when the transfer of load is not possible through the foot of a standard anchor. This is usually for thin reinforced units or lightweight concrete. Reduced bond stress may need to be considered for lightweight concrete.

The re-bar tail must be in tight contact with the bottom of the hole to prevent concrete breakout when lifting, and the tail must have a 30° bend as shown below.

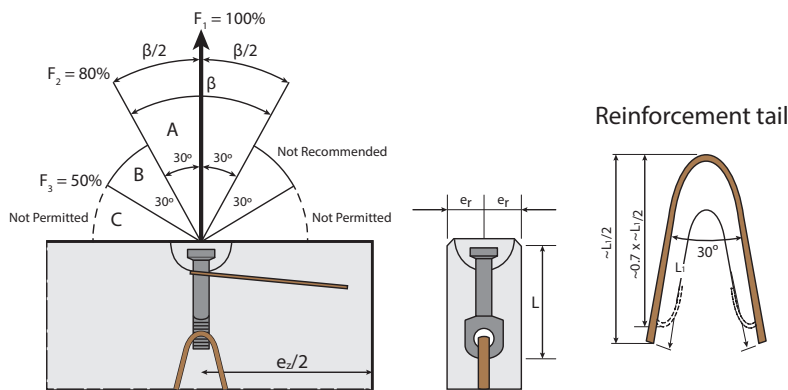
Dimensions of Capstan Eye Anchor

Load Group t	Part Code Black	Part Code Galv	L mm	D1 mm	D2 mm	D3 mm	D4 mm	E mm	F mm
1.3	1.3E065	1.3E065G	65	19	10	19	10	60	10
2.5	2.5E090	2.5E090G	90	26	14	27	13	74	11
5.0	5.0E120	5.0E120G	120	36	20	42	20	94	15
10.0	10E180	10E180G	180	46	28	57	25	118	15
20.0	20E250	20E250G	250	69	39	76	37	160	15



The angled lift reinforcement must be placed in direct contact with the shank of the anchor, and as close as possible under the recess former.

Note: Reinforcement D required for angled lift.



- (A) Lifting without angle lift reinforcement only allowed when:
 Concrete Strength $\geq 15\text{N/mm}^2 + 3$ times min. thickness of unit
 Concrete Strength $\geq 25\text{N/mm}^2 + 2.5$ times min. thickness of unit
 Concrete Strength $\geq 35\text{N/mm}^2 + 2$ times min. thickness of unit
 (min thickness of unit = $2 \times e_r$)
- (B) Where concrete strength $\geq 25\text{N/mm}^2$ F_2 can be taken as 100%
- (C) Angle of $\beta/2 \geq 120^\circ$ due to chain or cable spread angle is not permitted.

Load capacity and reinforcement of Capstan Eye Anchor

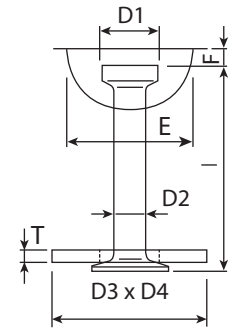
Load Group t	Part Code Black	Unit Thickness $2 \times e_r$ mm	Distance Between Anchors e_z mm	Square Mesh Reinforcement Both Sides	Reinforcement Tail			Load Capacity		
					Diameter mm	Concrete Strength			Axial Lift up to 30°	Angled Lift up to 45°
						15 N/mm ²	25 N/mm ²	35 N/mm ²	at concrete strength	
						L_1 mm			15 N/mm ²	15 N/mm ²
1.3	1.3E065	65	505	A193	H10	655	515	425	13.0	10.1
2.5	2.5E090	90	605	A193	H12	1005	805	655	25.0	19.9
5.0	5.0E120	120	755	A193	H16	1705	1355	1105	50.0	39.9
10.0	10E180	180	1205	A193	H20	2005	1605	1305	100.0	79.9
20.0	20E250	250	1505	A193	H32	3005	2405	1955	200.0	159.9

RFA-TECH CAPSTAN PLATE ANCHORS

The Capstan Plate Anchor is designed for reinforced concrete slabs too thin for a standard Capstan Anchor to work effectively.

The minimum panel thickness is shown on the table below, and if thinner panels are required then it is recommended that additional corrosion resistance on the underside of the anchor is considered.

Load Group t	Part Code Black	Part Code Galv	L mm	D1 mm	D2 mm	D3 x D4 mm	T mm	E mm	F mm
2.5	2.5P055	2.5P055G	55	26	14	70 x 70	6	74	11
2.5	2.5P120	2.5P120G	120	26	14	70 x 70	6	74	11
5.0	5.0P065	5.0P065G	65	36	20	90 x 90	8	94	15
5.0	5.0P120	5.0P120G	120	36	20	90 x 90	8	94	15
10.0	100P115	100P115G	115	46	28	90 x 90	10	118	15
10.0	100P150	100P150G	150	46	28	90 x 90	10	118	15



Reinforcement and load capacity for axial lift and angled lift up to $\beta - 45^\circ$

Load Group t	Part Code Black	Unit Thickness D mm	Distance Between Anchor e_z mm	Reinforcement		Load Capacity (kN)			
				D_1 mm	L_t mm	at Concrete Strength			
						15 N/mm ²	15 N/mm ²	35 N/mm ²	45 N/mm ²
2.5	2.5P055	90	565	H8	205	10.7	13.8	16.4	18.6
	2.5P120	155	1005	H10	305	25.0	25.0	25.0	25.0
5.0	5.0P065	105	1005	H12	455	16.0	20.7	24.5	27.8
	5.0P120	150	1005	H12	455	33.8	43.6	50.0	50.0
10.0	10P115	155	1285	H16	605	34.5	44.6	52.7	59.8
	10P150	190	1285	H16	605	55.8	72.0	85.2	96.6

(A) Lifting without angle lift reinforcement

only allowed when:

Concrete Strength $\geq 15\text{N/mm}^2 + 3$ times min. thickness of unit

Concrete Strength $\geq 25\text{N/mm}^2 + 2.5$ times min. thickness of unit

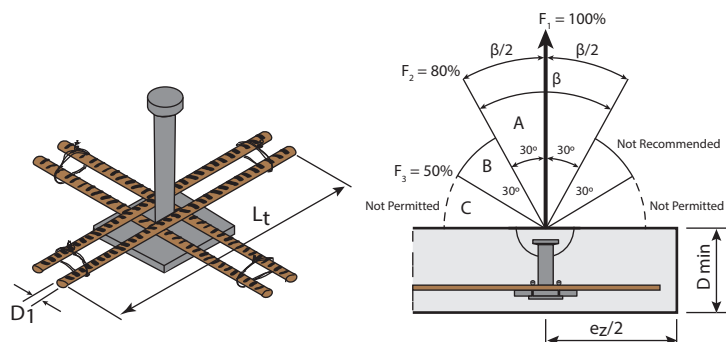
Concrete Strength $\geq 35\text{N/mm}^2 + 2$ times min. thickness of unit

(min thickness of unit = $2 \times e_z$)

(B) Where concrete strength $\geq 25\text{N/mm}^2$ F_2 can be taken as 100%

(C) Angle of $\beta/2 \geq 120^\circ$ due to chain or cable spread angle is not permitted.

The structural design for the slab must be designed by others.

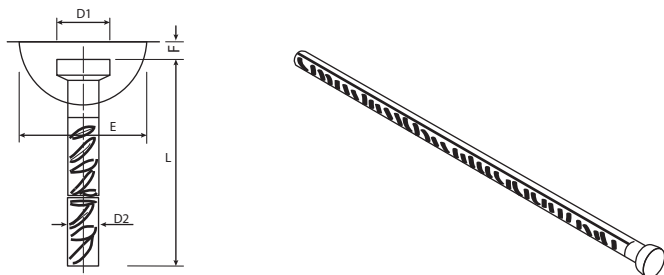


RFA-TECH CAPSTAN ROD ANCHORS

The Capstan Rod Anchor is designed to lift very thin wall panels, reinforced girders or similar types of unit as well as pre-stressed wall panels.

The anchor consists of a ribbed steel reinforcement bar with a forged Capstan lifting head. The load is transferred into the concrete by the ribs of the steel bar.

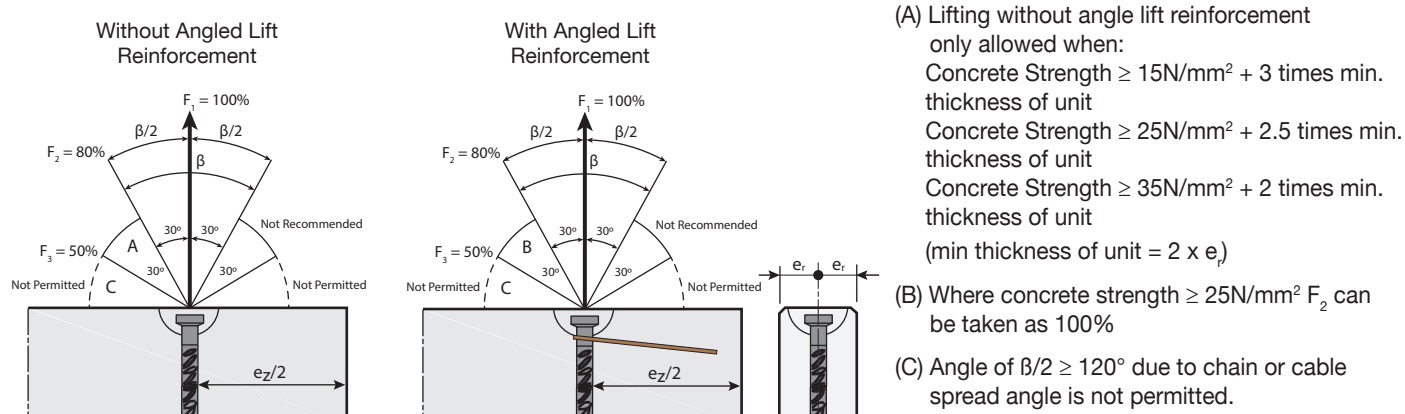
For special applications the bar can be bent in an offset manner to fit units such as sandwich panels.



Dimensions of Capstan Rod Anchors

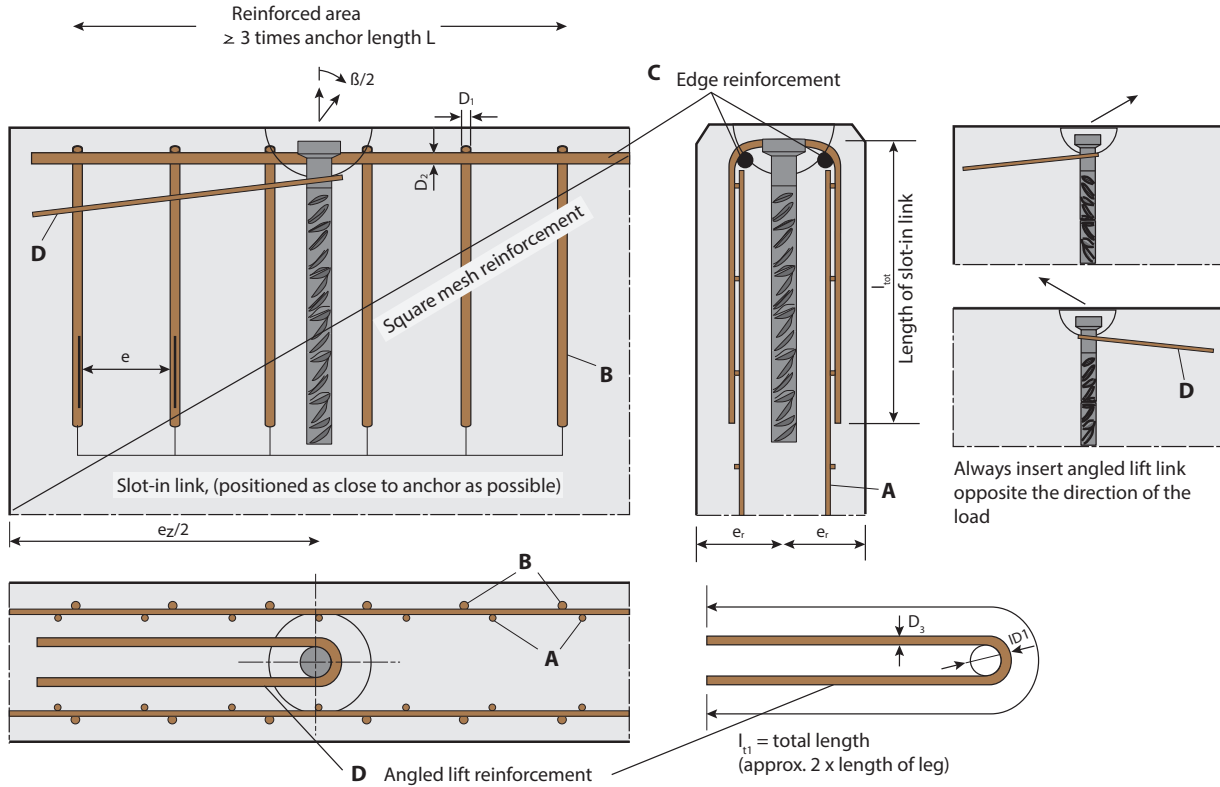
Load Group t	Part Code Black	Part Code Galv	L mm	D1 mm	D2 mm	E mm	F mm
2.5	2.5R40	2.5R40G	400	26	14	74	11
	2.5R52	2.5R52G	520	26	14	74	11
5.0	5.0R58	5.0R58G	580	36	20	94	15
	5.0R90	5.0R90G	900	36	20	94	15
7.5	7.5R75	7.5R75G	750	46	24	118	15
	7.5R115	7.5R115G	1150	46	24	118	15
10.0	10R87	10R87G	870	46	28	118	15
	10R130	10R130G	1300	46	28	118	15
15.0	15R108	15R108G	1080	69	34	160	15
	15R155	15R155G	1550	69	34	160	15

Special lengths are available to order on request.



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

REINFORCEMENT AND LOAD CAPACITIES FOR CAPSTAN ROD ANCHORS



Reinforcement and load capacity for axial lift and angled lift up to $\beta = 90^\circ$

Load Group t	Part Code Black	Unit Thickness $2 \times e_r$ mm	Distance Between Anchors e_z mm	Square Mesh Reinforcement A	Slot in Links B		Axial Lift up to $\beta = 30^\circ$			Angled Lift up to $\beta = 30^\circ$				
					$D_1 \times L_{tot}$ mm	e mm	Edge Reinforcement C D_2	Load Capacity (kN) Concrete Strength		Angled Lift Link D			Load Capacity (kN) Concrete Strength	
								15 N/mm ²	35 N/mm ²	D_3 mm	L_{11} mm	ID1 mm	15 N/mm ²	25 N/mm ²
2.5	2.5R40	80	825	2 x A193	H8 x 545	90	-	25.0	25.0	H10	605	24	19.9	25.0
	2.5R52	100			1055			H8 x 605	25.0				25.0	19.9
5.0	5.0R58	100	1155	2 x A193	H10 x 685	120	2 x H12	40.8	50.0	H12	1005	34	32.6	50.0
		120						140	44.1				50.0	35.3
7.5	7.5R75	140	1505	2 x A193	H10 x 745	140	2 x H16	47.0	50.0	H20	1005	41	37.6	50.0
		160						160	50.0				50.0	39.9
10.0	10R87	120	1755	2 x A193	H10 x 885	160	2 x H16	66.0	75.0	H20	1105	49	52.8	75.0
		140						1755	H10 x 805				70.0	75.0
15.0	15R108	160	2205	2 x A193	H10 x 925	200	2 x H16	75.0	75.0	H25	1105	70	59.9	75.0
		160						2205	H12 x 1025				100.0	100.0
	15R155	200	3105	2 x A193	H12 x 1205			150.0	150.0				119.9	150.0

$\beta/2 \leq 30^\circ$ is the preferred lifting angle

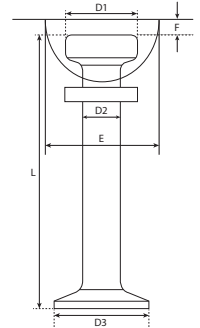
(1) If the unit's thickness is less than $2 \times e_r$, then slot-in links are required.

RFA-TECH CAPSTAN DOUBLE HEAD ANCHORS

The Double Head Capstan Anchor has been specifically developed for use in pipe production where anchor installation is automated, or where the upright moulds have the openings for the anchors to be installed.

The second head of the anchor assists accurate positioning, and ensures perpendicular installation as it sits tightly in the hollow of the former and creates a perfectly formed recess.

This feature also benefits the production of high volume flooring where large amounts of anchors are installed on a regular basis. The rubber former is hard wearing and has a thread which allows quick removal and cleaning, with no requirement to remove excess concrete in the void often experienced when using standard formers in floated applications. This anchor is lifted with the same shackle as standard anchors and the load capacities are identical to the equivalent sized standard headed anchors.

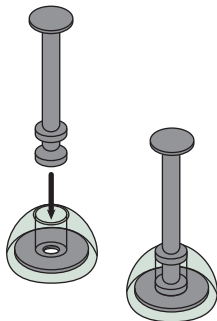


Recess Formers

There are magnetic and rubber formers available for Double Head Anchors.

Rubber formers work by a tight interference fit of the two heads in the centre of the former as shown below. They have a metric screw thread in the base to attach through formwork which can also be used with a threaded tool for quick removal from cured concrete.

Magnetic formers are also made from a rubber body and have magnets in the base to securely attach to the formwork.

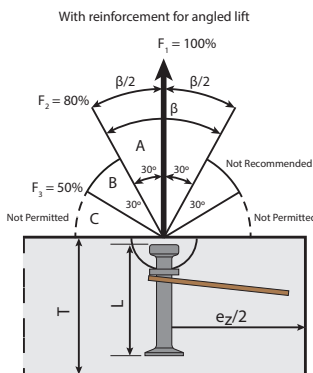


Load Group	Part Code Black	Part Code Galv	Length L mm	D1 mm	D2 mm	D3 mm	E mm	F mm
1.3	1.3D065	1.3D065G	65	18	10	25	60	10
1.3	1.3D085	1.3D085G	85	18	10	25	60	10
1.3	1.3D120	1.3D120G	120	18	10	25	60	10
2.5	2.5D065	2.5D065G	65	25	14	35	74	11
2.5	2.5D110	2.5D110G	110	25	14	35	74	11
2.5	2.5D120	2.5D120G	120	25	14	35	74	11
2.5	2.5D170	2.5D170G	170	25	14	35	74	11
5.0	5.0D120	5.0D120G	120	36	20	50	94	15
5.0	5.0D180	5.0D180G	180	36	20	50	94	15
5.0	5.0D240	5.0D240G	240	36	20	50	94	15

Permissible Loads for Capstan Double Head Anchors

Load capacity when lifting slabs with any direction of lift

Load Group	Part Code Black	Length of Anchor L mm	Slab Thickness T mm	Distance Between Anchors e_z mm	Load Capacity (kN) for			
					Axial Lift up to 60° [β]	Axial Lift up to 90° [β]	Axial Lift and Angled Lift up to 90° [β]	
					at Concrete Strength			
					15 N/mm ²	15 N/mm ²	25 N/mm ²	35 N/mm ²
1.3	1.3D065	65	100	305	13.0	10.3	13.0	13.0
2.5	2.5D085	85	120	385	19.4	15.5	25.0	25.0
5.0	5.0D120	120	160	505	29.4	23.5	38.0	45.0

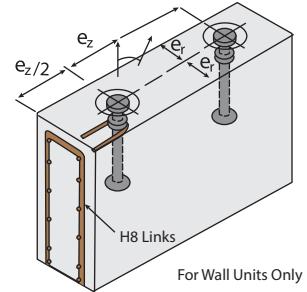


- (A) Lifting without angle lift reinforcement only allowed when:
 Concrete Strength $\geq 15\text{N/mm}^2 + 3$ times min. thickness of unit
 Concrete Strength $\geq 25\text{N/mm}^2 + 2.5$ times min. thickness of unit
 Concrete Strength $\geq 35\text{N/mm}^2 + 2$ times min. thickness of unit
 (min thickness of unit = $2 \times e_z$)

- (B) Where concrete strength $\geq 25\text{N/mm}^2$ F_2 can be taken as 100%
- (C) Angle of $\beta/2 \geq 120^\circ$ due to chain or cable spread angle is not permitted.

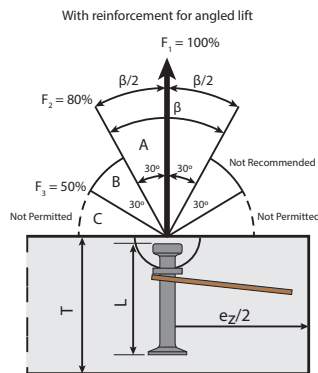
PERMISSIBLE LOADS FOR RFA-TECH CAPSTAN DOUBLE HEAD ANCHORS

Load capacity when lifting slabs with any direction of lift



Note: These units require reinforcement A, B, C, reinforcement D with an angled lift (reinforcement see page 9)

Load Group t	Part Code Black	Length of Anchor L mm	Minimum Height of Wall T mm	Minimum Wall Thickness 2 x e _w mm	Distance Between Anchors e _z mm	Load Capacity (kN) for				
						Axial Lift up to 60° [β]	Axial Lift up to 90° [β]	Axial Lift and Angled Lift up to 90° [β]		
						at Concrete Strength				
						15 N/mm ²	15 N/mm ²	25 N/mm ²	35 N/mm ²	
1.3	1.3D120	120	255	85	305	13.0	10.6	13.0	13.0	
				105		13.0	12.6			
				125		13.0	13.0			
2.5	2.5D120	120	255	125	385	18.0	14.4	23.2	25.0	
				145		20.2	16.1			25.0
				165		22.3	17.8			25.0
2.5	2.5D170	170	355	105	385	20.6	16.4	25.0	25.0	
				125		23.6	18.9			
				145		25.0	21.7			
5.0	5.0D240	240	505	205	505	45.5	36.4	50.0	50.0	
				225		48.9	39.1			
				245		50.0	41.8			



(A) Lifting without angle lift reinforcement only allowed when:
 Concrete Strength $\geq 15\text{N/mm}^2 + 3$ times min. thickness of unit
 Concrete Strength $\geq 25\text{N/mm}^2 + 2.5$ times min. thickness of unit
 Concrete Strength $\geq 35\text{N/mm}^2 + 2$ times min. thickness of unit
 (min thickness of unit = $2 \times e_w$)

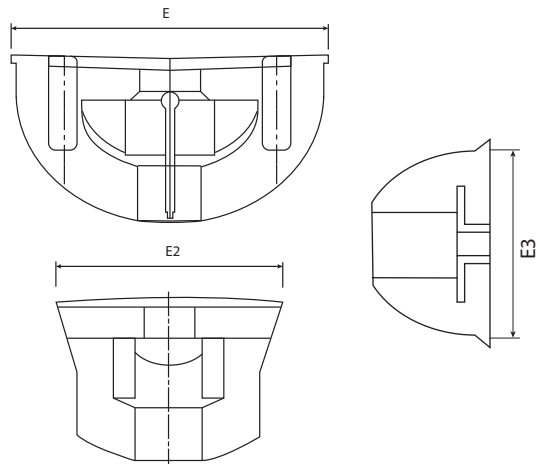
(B) Where concrete strength $\geq 25\text{N/mm}^2$ F_2 can be taken as 100%
 (C) Angle of $\beta/2 \geq 120^\circ$ due to chain or cable spread angle is not permitted.

RFA-TECH CAPSTAN RECESS FORMERS

The Capstan Anchor must be installed in the unit using the correct former for the anchor and application. This provides quick and secure installation and forms a recess for the shackle. Only the correct former will fit the anchor, and the load group is marked on each one. The former can be used by floating in the concrete, or by bolting through the formwork.

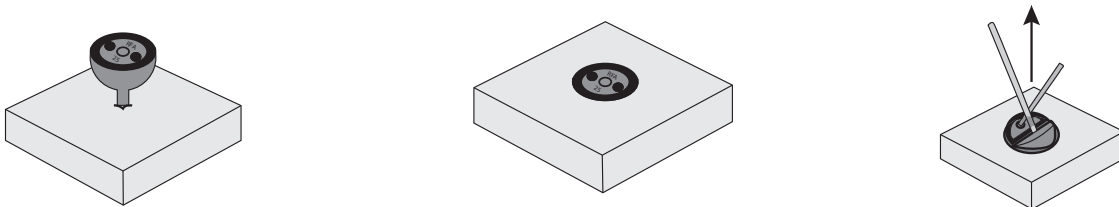
The rubber former is resistant to oil and retains its shape in temperatures up to 120°C. The former is reusable many times if correctly used and cleaned after each use. Mould oil should be applied to the former before the anchor is inserted. Short sided formers are also available on request and are for use when lifting thin panels.

Load Group t	Including Plate with Fixing Screw				Double Head Formers	
	Part Code Standard	E mm	Part Code Short Sided	E2 mm	Doublehead Part Code	E3
1.3	01.3FR	60	01.3FRS	42	01.3FRD	60
2.5	02.5FR	74	02.5FRS	52	02.5FRD	74
5.0	05.0FR	94	05.0FRS	69	05.0FRD	95
7.5	07.5FR	118	07.5FRS	85	-	-
10.0	10.0FR	118	10.0FRS	85	-	-
15.0	15.0FR	160	15.0FRS	124	-	-
20.0	20.0FR	160	20.0FRS	124	-	-
32.0	32.0FR	214	-	-	-	-



Floated Installation

With this application the concrete is poured first and the anchor is installed once the fill level has been achieved. The anchor is inserted into the concrete until the bottom of the former is touching the concrete, which should then be vibrated until the top is flush with the concrete. At its final position the anchor must be perpendicular to the base of formwork. It is advisable to use a fixing screw and a wooden block to ensure the former is tightly shut to prevent any concrete ingress.

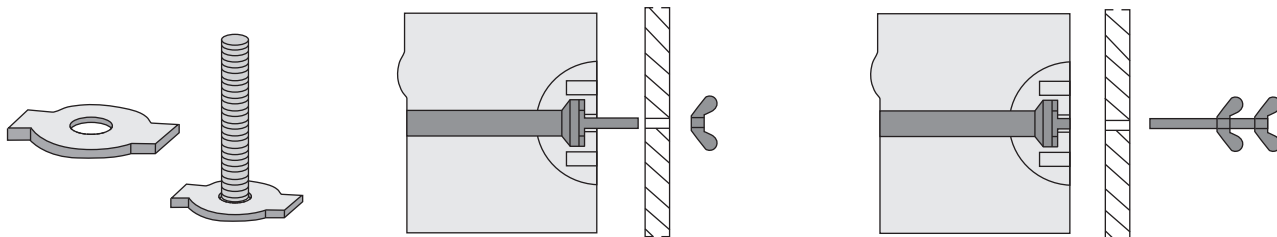


Removal of Former

When the concrete has cured the former is simple to remove. With two pieces of reinforcement bar, use a scissor action to release the former from around the anchor and lift the former clear. If there is any excess concrete in the recess this should be removed before lifting.

Installation with Fixing Screw

When installing through wooden formwork a fixing screw or nut is required. If the sides of formwork can be removed in a horizontal direction then a fixing screw can be used. When this is not possible then a separate fixing nut and screw is required. These are available in all load groups and fixing nuts are available to special order.



RFA-TECH MAGNETIC RECESS FORMERS

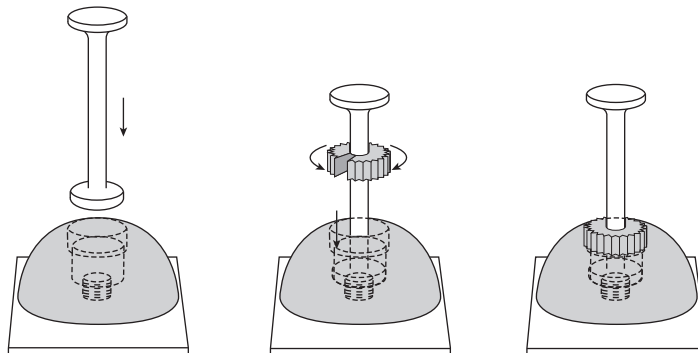
The Capstan Anchor can be installed in metal moulds by the use of magnetic formers. These are used where the lifting anchors are not accessible when casting. They are available in load groups from 1.3t to 10.0t. All magnetic formers are zinc plated for corrosion resistance or made with a rubber coating.

Load Group t	Metal Magnet Part Code	Adhesion	Rubber Sleeve Part Code	Rubber Magnet Part Code	Adhesion
1.3	1.3MFR	170kpi	1.3MFRS	1.3MFRR	110kpi
2.5	2.5MFR	265kpi	2.5MFRS	2.5MFRR	185kpi
5.0	5.0MFR	470kpi	5.0MFRS	5.0MFRR	160kpi
7.5/10.0	10.0MFR	600kpi	7.5MFRS	-	-
			10.0MFRS	-	-

Using Magnetic Formers

The magnetic adhesion holds the former onto the metal formwork with sufficient strength to prevent any movement when pouring concrete. The anchor is then placed in the centre of the former and the rubber sleeve put around the shank and pushed into the void, holding it tightly in position as shown below. The former and sleeve should be coated in mould oil before casting. When the unit is struck the former remains on the mould with the anchor and sleeve coming away with the unit. The sleeve should then be removed and cleaned for re-use.

When installing with magnetic formers, particularly when the anchors are horizontal to the formwork, provisions should be made to ensure they remain fixed during pouring. This can be done by tying the anchor to the formwork or by using spacers.



RFA-TECH CAPSTAN LIFTING SHACKLES

The Capstan Shackle is the attachment used for lifting, turning and transportation of concrete units with the corresponding anchors cast in. This is a manually operated device which is available in 1.3t–32.0t load groups.

All health and safety regulations must be observed for the country of use, and suitable risk assessments should be undertaken when using RFA-Tech lifting shackles with site lifting equipment such as cranes.

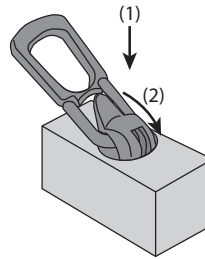
A copy of these instructions must be kept available at the worksite for reference by all operatives. The management are responsible for ensuring that the rules set out in this manual are adhered to alongside the regular inspections that must be carried out, according to the applicable rules for their country of use such as LOLER in the United Kingdom.

Using Capstan Lifting Shackles

Load Group t	Part Code
1.3	01.3UE
2.5	02.5UE
5.0	05.0UE
7.5t–10.0	10.0UE
20.0	20.0UE
32.0	32.0UE

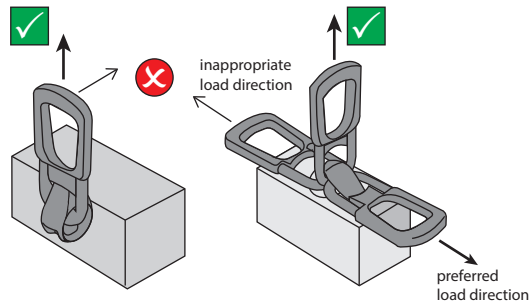
Engaging

Select the correct shackle and place the head opening over the anchor (1) and lower the weighted lip down onto the concrete as shown in (2). The shackle will now be ready for use.



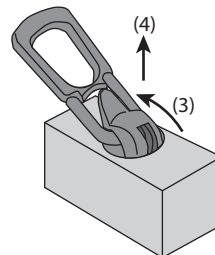
Lifting

Once the shackle is engaged the unit can be lifted. The direction of lip must always be in the direction of the lift as this locks the shackle under load. The shackle is suitable for axial / angled lifting, turning, pitching and swivelling of units, providing the anchors have been suitably reinforced for the lift in question. Please observe the maximum lifting angles per the concrete unit's lifting design, which should be supplied by the precast manufacturer or engineer.



Releasing

Once the lift has been completed, the shackle can be released by moving the lip towards the handle (3) and then lifting it away from the anchor (4). Always ensure that the shackle is clear of the recess before withdrawing the crane.



Identification and Markings

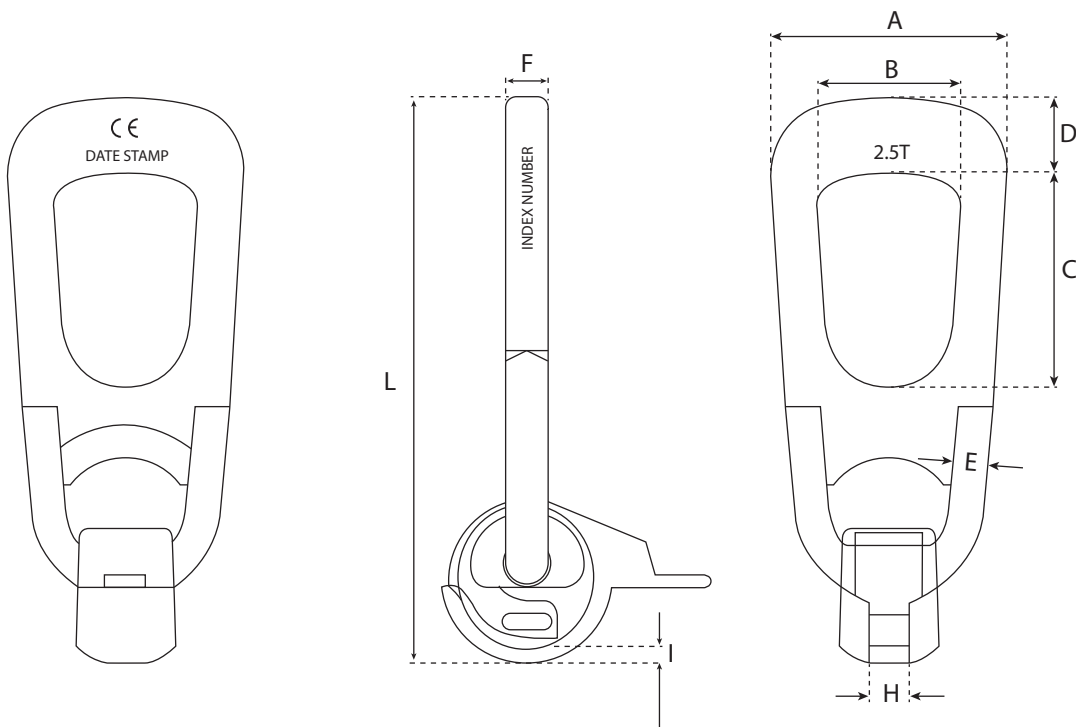
Each shackle is proof loaded to twice safe working load and undergoes a thorough inspection before being certified and index numbered for traceability when supplied new. Each shackle is also stamped with the CE mark and a date of manufacture stamp in the form month and year, e.g. March 2013 would be 0313.

All health and safety regulations must be observed for the country of use and suitable risk assessments should be undertaken when using RFA-Tech lifting shackles with site lifting equipment such as cranes.

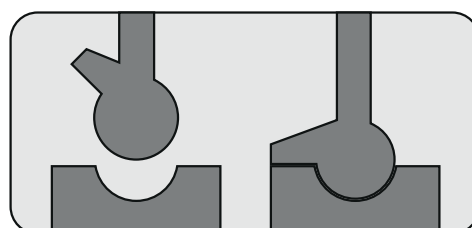
Dimensions of Capstan Lifting Shackle

Load Group t	Part Code	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	L mm
1.3	01.3UE	77	44	70	22	14	14	7.0	11	185
2.5	02.5UE	90	55	82	29	14	16	8.5	16	242
5.0	05.0UE	121	67	88	38	20	20	10.0	21	285
7.5-10.0	10.0UE	168	93	116	52	28	25	14.0	30	400
20.0	20.0UE	195	113	150	70	36	35	21.0	41	510
32.0	32.0UE	273	267	188	102	40	40	28.5	52	674

Each Capstan Lifting Shackle is marked with specified identification details as shown below. Each carries the manufacturer's name, load group, CE mark, date of manufacture, an operation sketch and an individual test index number.



Operating Sketch



Inspection of Capstan Shackles

The user must ensure that the Capstan Shackles are inspected for any damage before each lift. In addition, and in accordance with the regulations of the country of use, the customer must carry out full inspections at the regular intervals required. These must be carried out by a qualified person at intervals to suit the site conditions, or in any event every six months.

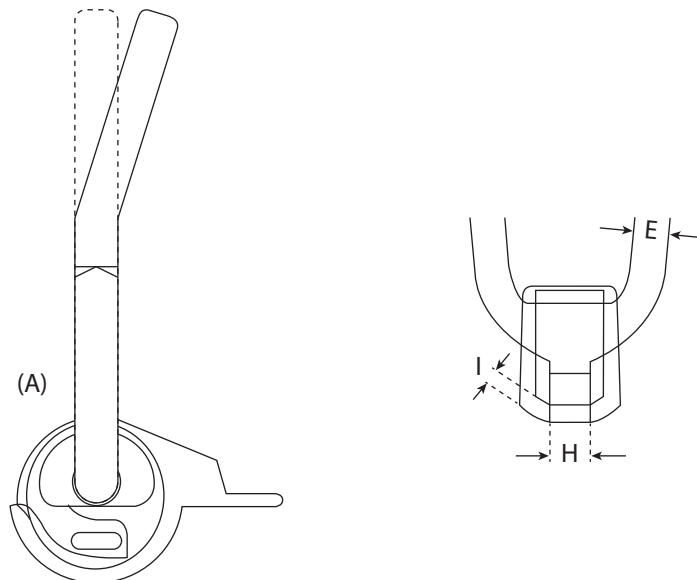
Quarantine any shackle:

- If it is deformed or bent in any manner
- If it is worn such that the H_{max} and I_{min} dimensions are exceeded
- If the E_{min} dimension is exceeded
- If the identification marking is worn away or illegible due to damage

Examinations must be recorded in a report, showing the values measured during each inspection. Records must be completed, filed and stored in an appropriate place and preferably with an electronic backup. As a guide, experience has shown that shackles last approximately six years. Alteration and repairs to the Capstan Shackles, especially any welding operations or grinding off any burrs caused by crane hooks is strictly forbidden.

Limiting Dimensions for Capstan Lifting Shackle

	Load Group					
	1.3	2.5	5.0	7.5 - 10.0	15.0 - 20.0	32.0
Maximum Dimension for 'I' and Minimum Dimension for 'H' (mm)						
I_{min}	5.5	6.0	8.0	12.0	18.0	24.0
H_{max}	13.0	18.0	25.0	32.0	46.0	58.0
Minimum Dimension for 'E' (mm)						
E_{min}	13.0	13.0	19.0	27.0	35.0	39.0



(A) Reject if the shackle is clearly deformed or bent at any point. Do not re-bend back into shape.

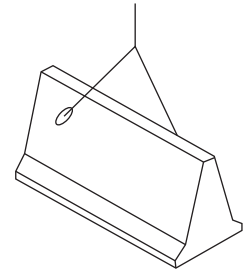
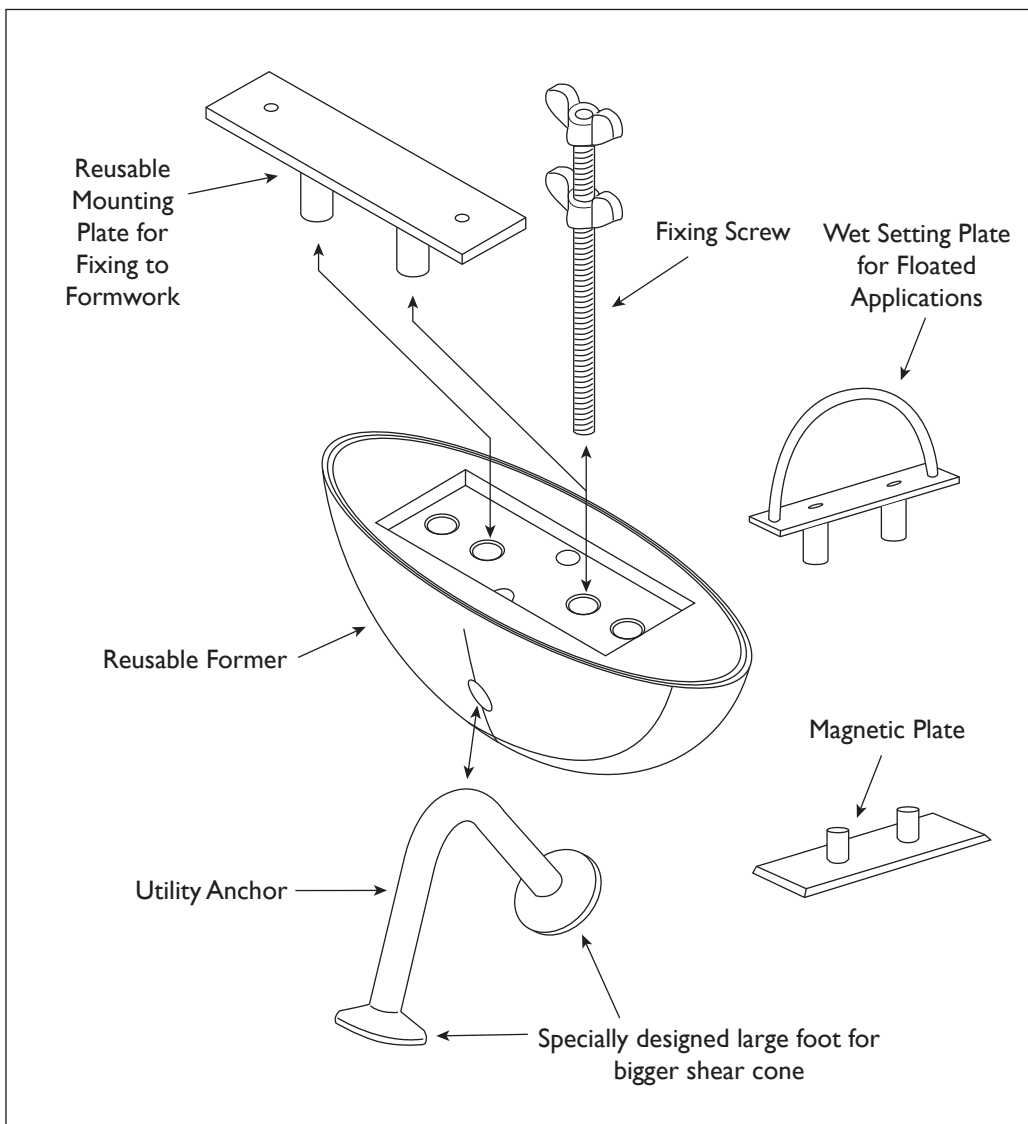
RFA-TECH UTILITY ANCHORS

The Utility Anchor is designed for reinforced or unreinforced concrete units and is especially useful for cover slabs, pipes and culverts; or any application where the construction site can benefit from an approved and tested lifting anchor, that can be used with a crane hook and no other special lifting device.

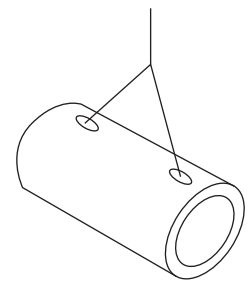
Benefits of Utility Anchors

- Economical alternative for de-moulding, handling and installing precast units
- Versatile system that can be used for most types of precast units
- Lifting capacity of up to 7500kg
- Easy to install

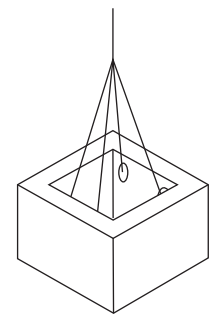
Utility Anchor Components



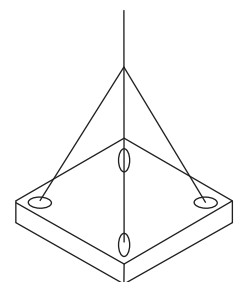
Barriers



Pipes



Boxes



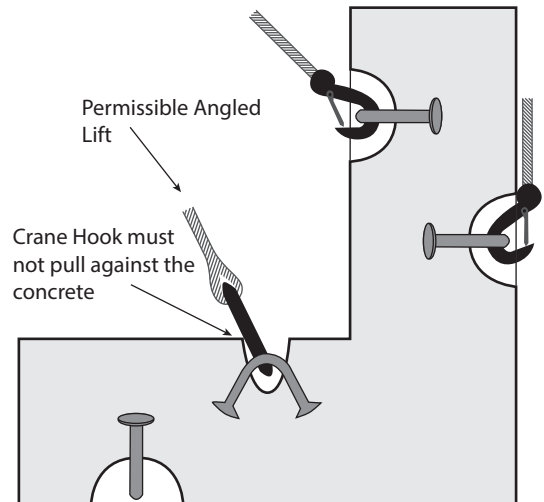
Slabs

INSTALLATION INSTRUCTIONS FOR PRECAST UNITS

Placement of Utility Anchors

This can vary dependant on the structural shape of the units and the precast manufacturer's or engineer's preferences. Utility Anchors are not designed for thin wall applications. Always ensure that the minimum edge distances are maintained, and that lifting design takes into consideration the minimum strengths, as noted in the capacity chart along with all other dynamic forces.

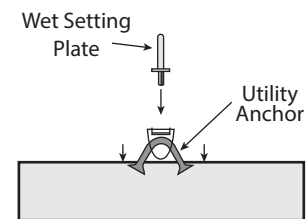
It is recommended that the formers should always be placed in line with the load direction of lifting chains, although angled lifting as shown opposite is permissible. Please note that the chain sling angle should not be sufficient to cause any interference of the crane hook against the concrete.



Typical Installations

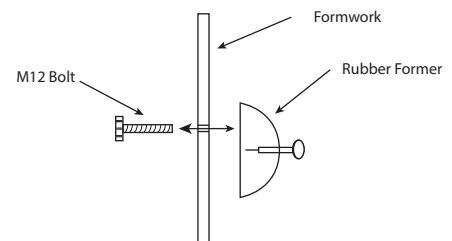
Wet Setting

1. Assemble the anchor, former and wet setting Plate
2. If required, use grease or duct tape for an extra seal for the cavity in the former.
3. Work the assembly into the wet concrete until the top surface of the former is flush to the concrete. Ensure that any air bubbles are removed with a vibrating poker before setting is complete.



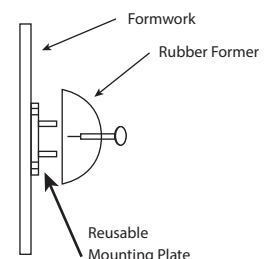
Fixing Screw Setting

1. Assemble the anchor and former.
2. If required, use grease or duct tape for an extra seal for the cavity in the former.
3. Drill a hole in the formwork at the installation point, and attach the assembly with the fixing bolt and the thread cast into the former.
4. Once concrete is poured, ensure that any air bubbles are removed well before setting is complete, via vibrating poker or similar method.



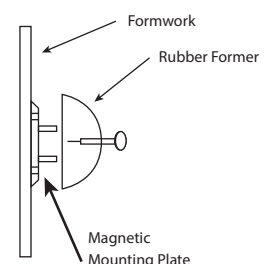
Fixing Plate Setting

1. Assemble the anchor and former.
2. If required, use grease or duct tape to seal the cavity in the former.
3. Screw or nail the fixing plate to the formwork at the installation point, and place the assembly on the pins and push firmly into place.
4. Once concrete is poured, ensure that any air bubbles are removed well before setting is complete with a vibrating poker.

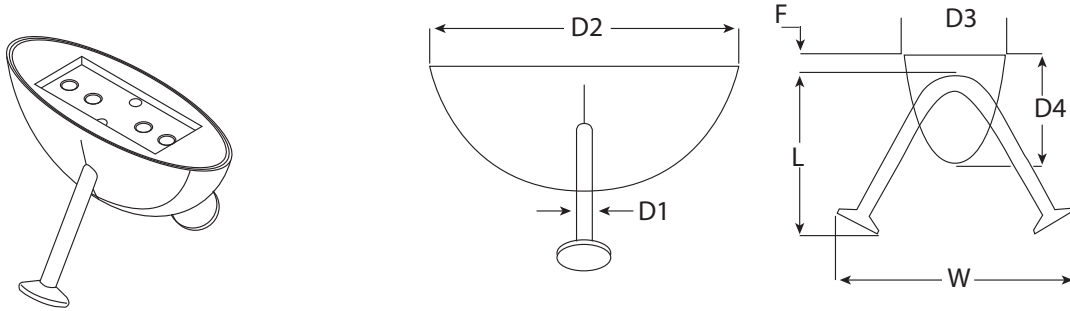


Magnetic Fixing Plate

1. Assemble the anchor and former.
2. If required, use grease or duct tape to seal the cavity in the former.
3. Place the magnetic former at the installation point.
4. Place the former on the magnet and push the former into place.
5. Once concrete is poured, ensure that any air bubbles are removed well before setting is complete with a vibrating poker.



Installation Instructions for Precast Units



Utility Anchor									
Part Code	L mm	W mm	D1 mm	F mm	Tension SWL Kg	Shear SWL Kg	Min Panel Thickness D mm	Min Edge Distance e _r mm	Distance Between Anchors e _r mm
UAG0.8T	80	134	12	15	800	1300	135	160	480
UAG1.8T	95	152	12	15	1800	2500	150	190	570
UAG2.0T	120	181	12	15	2000	3000	175	240	720
UAG2.5T	170	238	12	15	2500	3500	225	340	1020
UAG1.4T	80	143	17	15	1400	1800	135	160	480
UAG3.5T	95	161	17	15	3500	5000	150	190	570
UAG5.0T	120	189	17	15	5000	7000	175	240	720
UAG7.5T	170	247	17	15	7500	7500	230	340	1020

Please Note: When using UAG5.0T in shear load applications above 5000kg, use former UAF7.5T to ensure the use of a crane hook with sufficient capacity.



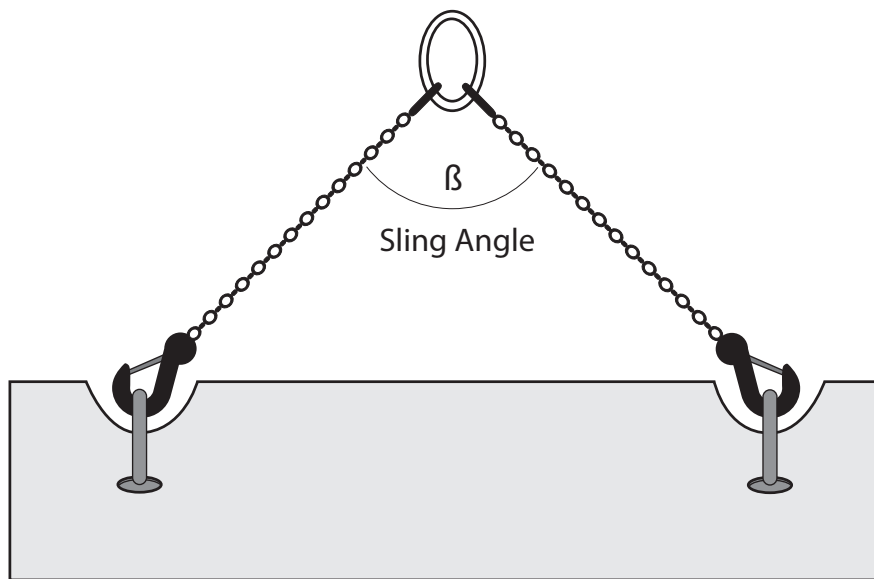
D1 mm	Utility Anchor Former				Wet Setting Plate Part Code	Magnetic Holding Plates
	Part Code	D2 mm	D3 mm	D4 mm		
12mm	UAF0.8T	203	76	89	UAFWSP12	UHPM0.8T
17mm	UAF3.5T	203	76	89	UAFWSP17	UHPM3.5T
17mm (7.5t Only)	UAF7.5T	252	76	89		UHPM7.5T

Installation Instructions for Precast Units

Angled Lifting

The safe working load figures on Page 30 are based on straight chains providing a pure tension lift. For angled lifting applications, please include the sling angle reduction factors as detailed below. Dynamic factors for transport will also apply as detailed on Page 5 of this manual.

Sling Angle Load Factors								
Sling Angle β	120°	105°	90°	75°	60°	45°	30°	15°
Load Factor	2.00	1.64	1.41	1.26	1.16	1.08	1.04	1.01



Adjusting Loads for Concrete Strength

The safe working loads detailed on Page 30 are based on a concrete compressive strength of 25N/mm² and are quoted for tensile applications. Please consult RFA-Tech for any special requirements in shear below this strength.

To convert the allowable load in tension for an unreinforced concrete strength of 25N/mm² to a greater or lesser concrete strength, multiply the safe working load at 25N/mm² by the applicable factor listed below.

Concrete Strength Adjustment Factors	
Increased Concrete Strength	
30N/mm ²	Multiply SWL by 1.05
35N/mm ²	Multiply SWL by 1.10
Decreased Concrete Strength	
20N/mm ²	Multiply SWL by 0.92
15N/mm ²	Multiply SWL by 0.75

RFA-TECH THREADED LIFTING ANCHORS

The RFA-Tech Threaded Lifting Anchors are a safe, simple and effective system for lifting most types of precast concrete units. The anchors are produced from high grade steel and, provided the anchor is specified and installed correctly, provide safe and secure lifting, turning and transportation of units. Anchors are available in zinc plated, galvanised, 304 and 316 stainless steel.

The system consists of two main components, the anchors in their various types and a lifting attachment such as a Lifting Loop or Swivel Eye that links the anchor to the crane hook. They are produced in load groups from 500kg to 12,500kg and there is a type and material to suit almost all precast units. Accessories such as recess formers and sealing caps are also available.

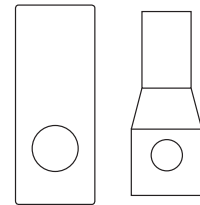
Each anchor is stamped with the manufacturer's identification mark, safe working load rating of the anchor, the batch number and CE mark. Lifting attachments are also marked with the load rating, CE mark along with an individual index number for full traceability of the system. All products are rigorously tested, inspected and are supplied with declarations of conformity with each order along with safe working instructions where applicable.

Threaded lifting anchors are designed for demoulding, pitching, transport and site fixing. It is likely that there will be numerous lifting operations from production to installation, so the handling at each point should be carefully considered at each stage, and an appropriate anchor should be selected. These anchors should not be used for repeated lifting applications over a prolonged period of time. If there are any technical queries, please contact RFA-Tech.

Anchor Summary

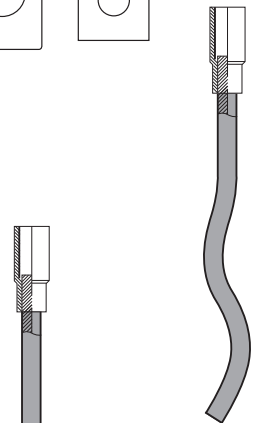
Lifting Sockets and Lifting Inserts

500kg to 12,500kg load ratings and are very versatile anchors that are suitable for most types of precast unit, particularly thin walled units where a long reinforcement tail bar can be used for exceptional anchorage in the concrete. Lifting Sockets have Rd threads and Lifting Inserts have Metric threads.



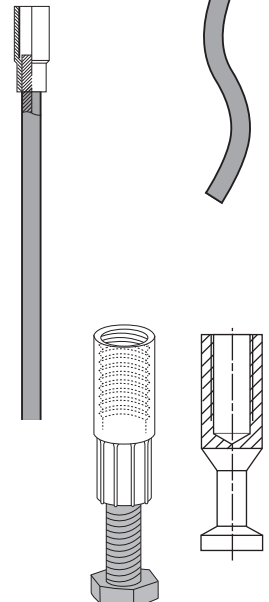
Wavy Tail Anchors

500kg to 12,500kg load ratings and are very versatile anchors that are particularly suitable for thin walled units where the integral reinforcement tail bar provides exceptional anchorage in the concrete. Wavy Tail Anchors consist of a socket swaged to a wavy reinforcement bar and come in short types for axial and angled lifting and long types that are also suitable for pitching units. Wavy Tails have Rd threads.



Re-Bar Anchors

500kg to 12,500kg load ratings and are very versatile anchors that are particularly suitable for thin walled units where the long reinforcement tail bar provided exceptional anchorage in the concrete. Re-Bar Anchors consist of a socket swaged to a straight reinforcement bar, they come in standard lengths and special lengths can be produced to order. Re-Bar Anchors are suitable for pitching units and have Rd threads.

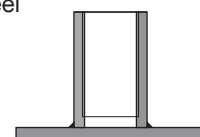


Crown/Bolt Anchors

500kg to 4,000kg load ratings and are for lifting slab units. Bolt Anchors also make very effective fixing inserts and have Rd threads.

Plate Anchors

500kg to 12,500kg load ratings and are for lifting thin slab units. These anchors require extra steel bars laid over the flat plate for anchorage in the concrete and are supplied with Rd threads.



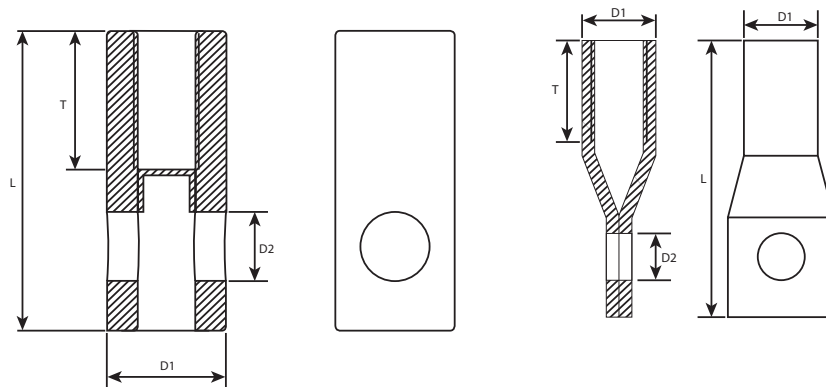
RFA-TECH LIFTING SOCKETS AND INSERTS

Flat End and Cylindrical Lifting Sockets provide simple lifting and transporting for most kinds of precast concrete units, particularly when casting into thin concrete panels. Flat End Lifting Inserts are available in both high grade zinc plated carbon steel and 304/316 grade stainless steel. Cylindrical Sockets are also available in both materials and are supplied in Rd threads or metric to special order.

All installation instructions are based on concrete safety factors of two times the axial load rating at a concrete strength of 15N/mm² at the time of first lift. All products are rigorously tested, inspected and are supplied with Declarations of Conformity with each order along with safe working instructions where applicable. Flat End and Cylindrical Lifting Sockets can be used in conjunction with Plastic Nailing Plates or Magnetic Holding Plates to provide a recess that can be made good on site.

Plastic Stopper Caps are also available to protect threads from weathering and ingress of dirt or foreign matter that can prevent the threads from engaging completely down the length of the socket. The anchors designed are for axial and angled lifts of $\beta \leq 90^\circ$.

Please contact RFA-Tech with any technical queries.

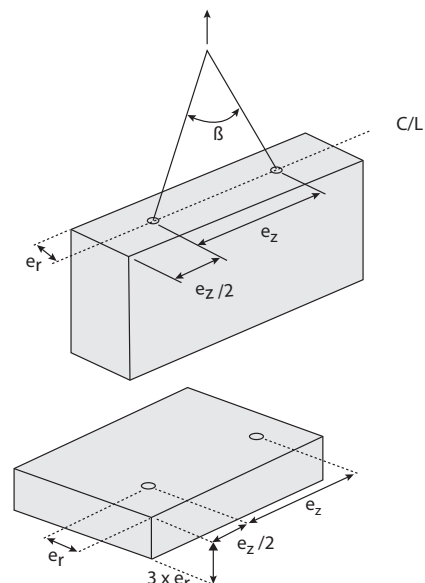


Cylindrical Lifting Sockets							Flat End Lifting Sockets						
Part Code Zinc Plated	Part Code Stainless Steel	Axial Load Rating	Size Thread x Length L	Overall Diameter D1	Rebar Hole Size D2	Usable Thread Length T	Part Code Zinc Plated	Part Code Stainless Steel	Load Rating	Size Thread x Length L	Overall Diameter D1	Rebar Hole Size D2	Usable Thread Length T
1200G12Z	1200G12S	500kg	Rd12 x 40	16	8	20	DG12060	DG12060S	500kg	M12 x 60	16	10	20
1200G16Z	1200G16S	1200kg	Rd16 x 54	21	13	26	DG16080	DG16080S	1200kg	M16 x 80	21	13	21.5
1200G20Z	1200G20S	2000kg	Rd20 x 69	27	15	34	DG20095	DG20095S	2000kg	M20 x 95	27	16	27
1200G24Z	1200G24S	2500kg	Rd24 x 78	31	18	36	DG24100	DG24100S	2500kg	M24 x 100	32	18	32
1200G30Z	1200G30S	4000kg	Rd30 x 103	40	21	52	DG30135	DG30135S	4000kg	M30 x 135	40	20	36
1200G36Z	1200G36S	6300kg	Rd36 x 125	48	26	60	DG30150	DG30150S	4000kg	M30 x 150	40	20	40
1200G42Z	1200G42S	8000kg	Rd42 x 140	54	32	70	-	-	-	-	-	-	-
1200G52Z	1200G52S	12500kg	Rd52 x 170	67	40	97	-	-	-	-	-	-	-

Anchor Spacing

The following should be observed for all anchor installations and should also have sufficient reinforcement as detailed on the next page.

Axial Load Rating	Size	Edge Distance e_r mm	Edge Distance e_z mm
500kg	M/Rd 12	37	300
1200kg	M/Rd 16	40	400
2000kg	M/Rd 20	50	550
2500kg	M/Rd 24	60	600
4000kg	M/Rd 30	70	650
6300kg	Rd 36	100	800
8000kg	Rd 42	120	1000
12500kg	Rd 52	138	1200

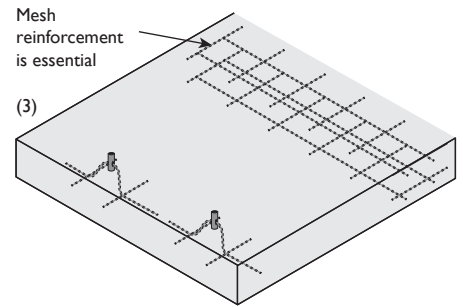


Axial Lifting

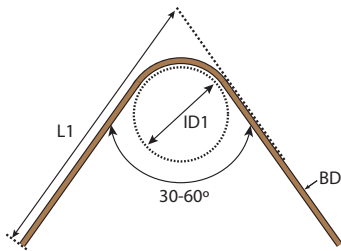
All Sockets and Inserts must be reinforced for lifting with high yield reinforcement bar, as per the table and sketches below. Reinforcement around the anchor for walls or beam type units can be in the form of two layers of mesh, or a re-bar cage with at least the minimum specification as detailed below. The socket's axial reinforcement should be in the form of a 60° angled high yield bar as shown in (1) below. For slab type units the reinforcement (L1) can be cranked down to fit the thickness of the panel as shown in (3). Straight bars must not be used and extra bars must be laid across the flats of the bars where they return to the flat of the panel. Mesh reinforcement above the insert is essential when using sockets and inserts to lift slabs. Slabs must have at least one layer of mesh above the anchor.

Axial Load Rating	Size	Leg Length L1 mm	Bar Diameter BD mm	Internal Diameter ID1 mm	Min. Mesh Reinforcement Both Sides
500kg	M/Rd 12	230	H6	24	A142
1200kg	M/Rd 16	320	H10	40	A142
2000kg	M/Rd 20	440	H12	48	A193
2500kg	M/Rd 24	475	H12	56	A193
4000kg	M/Rd 30	650	H16	64	A193
6300kg	Rd 36	820	H20	140	A193
8000kg	Rd 42	850	H25	175	A193
12500kg	Rd 52	1200	H25	196	A193

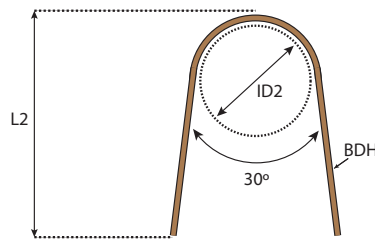
When using sockets to lift flat panels, the L1 reinforcement can be bent into the pattern below to fit the panel. The flats should be tied to the base reinforcement and the straight bars should be as long as the flats, as detailed below. Use the same diameter or larger reinforcement for the straight bars.



(1) Axial Reinforcement

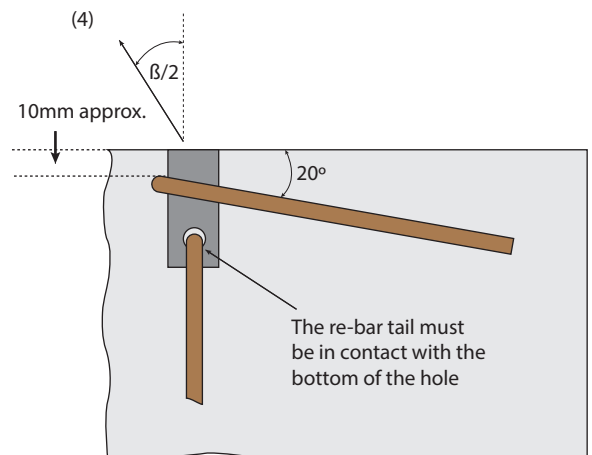


(2) Angled Lift Reinforcement



For angled lifts it is essential to reinforce the socket to ensure the load is distributed into the concrete unit, for angles of greater than $\beta = 25^\circ$ and $< 90^\circ$ the following reinforcement should be observed and installed in the panel as in (2), with a re-bar hanger as detailed in (4). The axial lift reinforcement must be in contact with the base of the socket. The angled lift reinforcement must be in contact with the barrel of the socket.

Axial Load Rating	Size	Leg Length L2 mm	Internal Diameter ID2	Bar Diameter BDH mm
500kg	M/Rd12	150	24	H6
1200kg	M/Rd16	200	32	H8
2000kg	M/Rd20	300	32	H8
2500kg	M/Rd24	400	40	H10
4000kg	M/Rd30	400	48	H12
6300kg	Rd36	550	56	H16
8000kg	Rd42	600	64	H16
12500kg	Rd52	750	140	H20



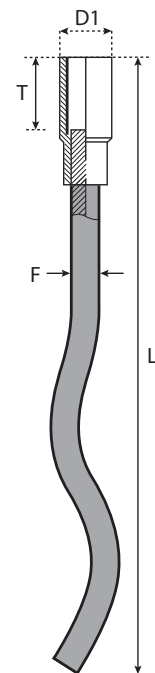
RFA-TECH WAVY TAIL LIFTING ANCHORS

Wavy Tail Anchors are quick to install and versatile for lifting most types of precast units. The anchor can be used to lift at concrete compressive strengths of 15N/mm² and above without any further reinforcement, providing the unit has sufficient mesh or re-bar cage with at least the minimum specification as detailed below. The socket of the Wavy Tail is available in high grade zinc plated carbon steel and is swaged to a waved reinforcement bar. They are available with Rd12 to Rd52 threads that have load ratings from 500kg to 12,500kg. Stainless Steel sockets and re-bar tails are available to special order.

All installation instructions are based on concrete safety factors of two times the axial load rating at a strength of 15N/mm² at the time of first lift. All products are rigorously tested, inspected and are supplied with Declarations of Conformity with each order along with safe working instructions where applicable.

Wavy Tails can be used in conjunction with Plastic Nailing Plates or Magnetic Holding Plates to provide a recess that can be made good on site. Plastic Stopper Caps are also available to protect threads from weathering. There are two standard lengths of re-bar tail available, both anchors are designed for axial and angled lifts of $\beta \leq 90^\circ$ and the long anchors also permit the turning of units with the correct reinforcement. Please contact RFA-Tech with any technical queries.

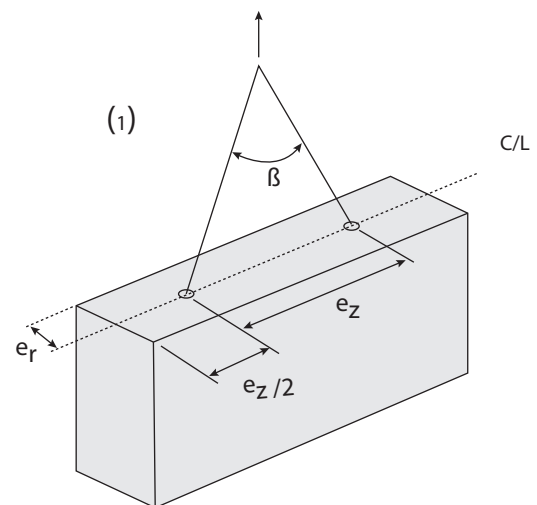
Part Code	Axial Load Rating	Size	Type	Length L mm	Usable Thread Length T mm	Overall Diameter D1 mm	Bar O/D F mm
WVTRD12S	500kg	Rd12	Short	108	22	16	8
WVTRD12L	500kg	Rd12	Long	137	22	16	8
WVTRD16S	1200kg	Rd16	Short	167	27	21.5	12
WVTRD16L	1200kg	Rd16	Long	216	27	21.5	12
WVTRD20S	2000kg	Rd20	Short	187	35	27	16
WVTRD20L	2000kg	Rd20	Long	257	35	27	16
WVTRD24S	2500kg	Rd24	Short	240	43	32	16
WVTRD24L	2500kg	Rd24	Long	360	43	32	16
WVTRD30S	4000kg	Rd30	Short	300	56	40	20
WVTRD30L	4000kg	Rd30	Long	450	56	40	20
WVTRD36S	6300kg	Rd36	Short	380	67	48	25
WVTRD36L	6300kg	Rd36	Long	570	67	48	25
WVTRD42S	8000kg	Rd42	Short	450	80	54	28
WVTRD42L	8000kg	Rd42	Long	620	80	54	28
WVTRD52L	12500kg	Rd52	Long	880	100	70	32



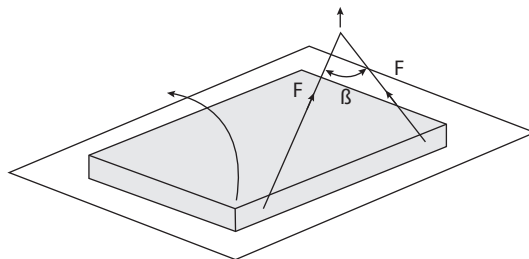
Installation – Long Wavy Tails

To ensure a safe lift, the following edge distances and mesh requirements must be observed.

Axial Load Rating	Size	Edge Distance e_r mm	Anchor Spacing e_z mm	Min. Mesh Reinforcement
500kg	Rd12	37	300	A142
1200kg	Rd16	40	400	A142
2000kg	Rd20	50	550	A193
2500kg	Rd24	60	600	A193
4000kg	Rd30	70	650	A193
6300kg	Rd36	100	800	A193
8000kg	Rd42	120	1000	A193
12500kg	Rd52	140	1200	A193



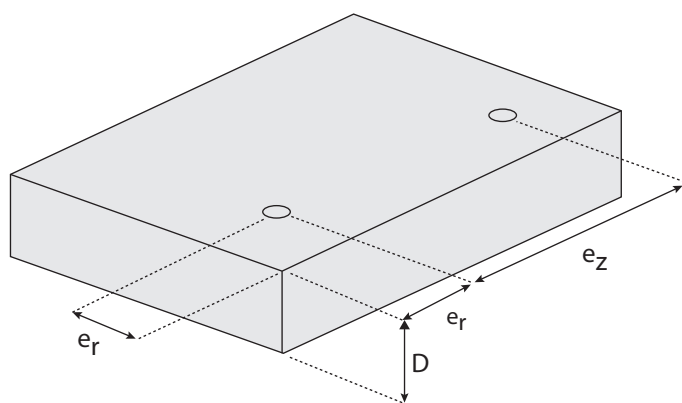
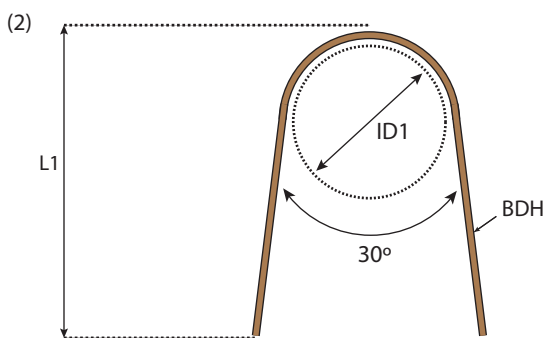
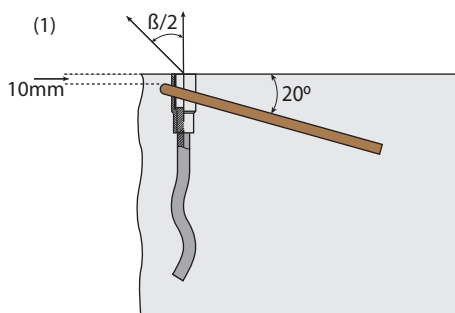
For turning units through 90° as detailed below, only half the weight of the unit is being lifted and therefore there is no reduction in the safe working load of the anchor. The same permissible loads and standard sling angle reduction factors apply. However, for lifting at these angles the permissible load per anchor is half the axial load rating. Sling angle factors apply to the chains in the same manner as axial lifting.



Installation - Short Wavy Tails

For angled lifts it is essential to reinforce the socket to ensure the load is distributed into the concrete unit. For angles of greater than $\beta = 25^\circ$ the following reinforcement should be observed and installed in the panel, as in (1). The reinforcement hanger (2) should be to the specifications in the table below and must be reinforced with high yield or stainless steel reinforcement bar. All standard sling angle reduction factors apply up to a maximum of $\beta = 90^\circ$ (1).

Axial Load Rating	Size	Edge Distance e_r	Anchor Spacing e_z mm	Min. Panel Depth D mm	Min. Mesh Reinforcement Both Sides	Bar Diameter BDH mm (2)	Leg Length L1 mm (2)	Internal Diameter ID1 mm (2)
500kg	Rd12	95	200	130	A142	H6	150	24
1200kg	Rd16	135	260	195	A142	H8	200	32
2000kg	Rd20	170	350	215	A193	H8	300	32
2500kg	Rd24	220	440	270	A193	H10	300	40
4000kg	Rd30	275	550	320	A193	H12	400	48
6300kg	Rd36	300	600	405	A193	H16	550	56
8000kg	Rd42	400	800	470	A193	H16	600	64



RFA-TECH RE-BAR ANCHORS

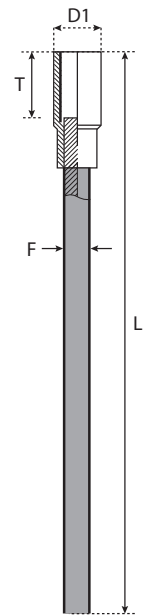
Re-bar Anchors are especially suitable for installation in slender concrete units with thin walls such as garages, transformer stations, shaft rings, etc. The anchor can be used to lift at compressive concrete strengths of 15N/mm² and above without any further reinforcement, providing the unit has a sufficient high yield mesh or re-bar cage with at least the minimum specification as detailed below. The socket of the Re-bar Anchor is available in high grade zinc plated carbon steel and is swaged to a straight reinforcement bar. They are available with Rd12 to Rd52 threads that have load ratings from 500kg to 12,500kg. Stainless Steel sockets and re-bar tails are available to special order.

All installation instructions are based on concrete safety factors of two times the axial load rating at a concrete strength of 15N/mm² at the time of first lift. All products are rigorously tested, inspected and are supplied with Declarations of Conformity with each order along with safe working instructions where applicable.

Re-bar Anchors can be used in conjunction with Plastic Nailing Plates or Magnetic Holding Plates to provide a recess that can be made good on site. Plastic Stopper Caps are also available to protect threads from weathering. The standard length of rebar tails available are detailed below, however special lengths and bent bars are available on request. The anchors designed are for axial and angled lifts of $\beta \leq 90^\circ$ and the turning of units with the correct reinforcement.

Please contact RFA-Tech with any technical queries.

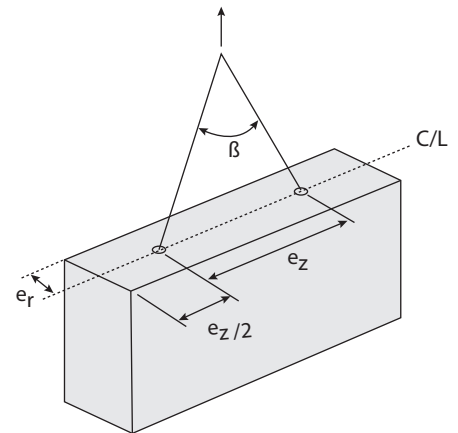
Part Code	Axial Load Rating	Size	Overall Length L mm	Usable Thread T mm	Overall Diameter D1 mm	Re-Bar Diameter F mm
RA12195Z	500kg	Rd12	195	22	16	8
RA16305Z	1200kg	Rd16	305	27	21.5	12
RA20350Z	2000kg	Rd20	350	32	27	16
RA24400Z	2500kg	Rd24	400	43	32	16
RA30510Z	4000kg	Rd30	510	56	40	20
RA36690Z	6300kg	Rd36	690	67	48	25
RA42840Z	8000kg	Rd42	840	80	54	28
RA52915Z	12500kg	Rd52	915	100	70	32



Installation – Re-bar Anchors

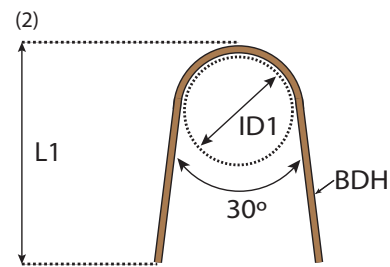
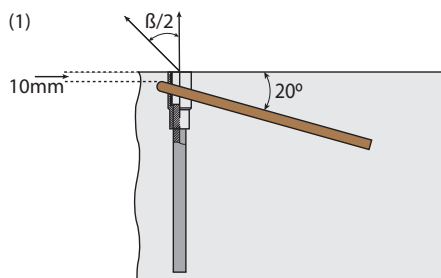
To ensure a safe lift, the following edge distances and mesh requirements must be observed.

Axial Load Rating	Size	Edge Distance e_r mm	Anchor Spacing e_z mm	Min. Mesh Reinforcement Both Sides
500kg	Rd12	30	300	A142
1200kg	Rd16	40	400	A142
2000kg	Rd20	55	550	A193
2500kg	Rd24	63	600	A193
4000kg	Rd30	70	700	A193
6300kg	Rd36	105	1000	A193
8000kg	Rd42	120	1000	A193
12500kg	Rd52	140	1200	A193



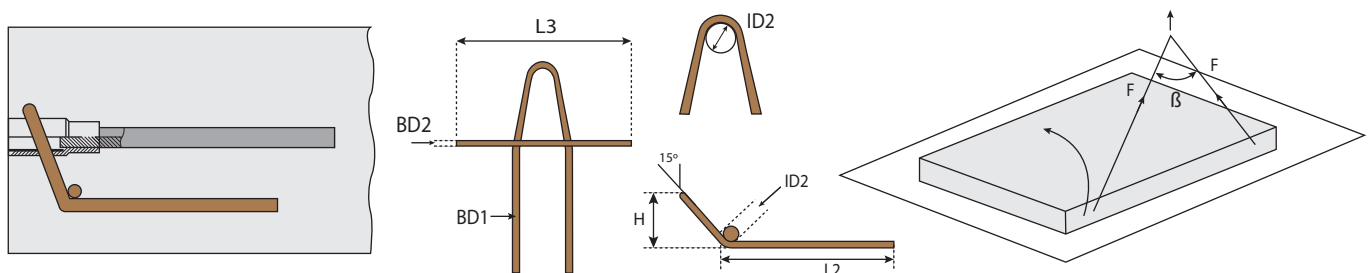
For angled lifts it is essential to reinforce the socket to ensure the load is distributed into the concrete unit. For angles of greater than $\beta = 25^\circ$ the following reinforcement should be observed and installed in the panel, as in (1). The reinforcement hanger (2) should be to the specifications in the table below and must be reinforced with high yield reinforcement bar. All standard sling angle reduction factors apply up to a maximum of $\beta = 90^\circ$.

Axial Load Rating	Size	Hanger Diameter BDH mm (2)	Leg Length L1 mm (2)	Internal Diameter ID1 mm (2)
500kg	Rd12	H6	150	24
1200kg	Rd16	H8	200	32
2000kg	Rd20	H8	300	32
2500kg	Rd24	H12	300	40
4000kg	Rd30	H12	400	48
6300kg	Rd36	H16	550	56
8000kg	Rd42	H16	600	64
12500kg	Rd52	H20	750	140



Pitching / Turning

For turning units through 90° as detailed below, only half the weight of the unit is being lifted and therefore there is no reduction in the safe working load of the anchor, and the same permissible loads and standard sling angle reduction factors apply. However, for lifting at these angles the permissible load per anchor is half the axial load rating. Sling angle factors apply to the chains in the same manner as axial lifting.



Axial Load Rating	Size	Leg Length L2 mm	Leg Length L3 mm	Bar Diameter BD1 mm	Bar Diameter BD2 mm	Internal Diameter ID2 mm	Height H mm
500kg	Rd12	270	280	H6	H8	24	35
1200kg	Rd16	420	400	H8	H12	32	49
2000kg	Rd20	490	490	H10	H12	40	64
2500kg	Rd24	520	550	H12	H16	48	75
4000kg	Rd30	570	580	H12	H16	48	92
6300kg	Rd36	690	700	H16	H16	56	118
8000kg	Rd42	830	850	H16	H20	64	143
12500kg	Rd52	930	1000	H20	H20	140	174

RFA-TECH BOLT ANCHORS

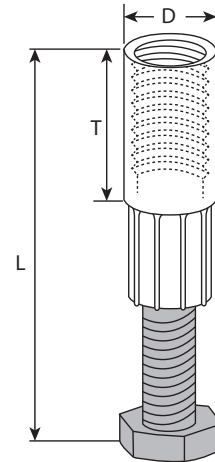
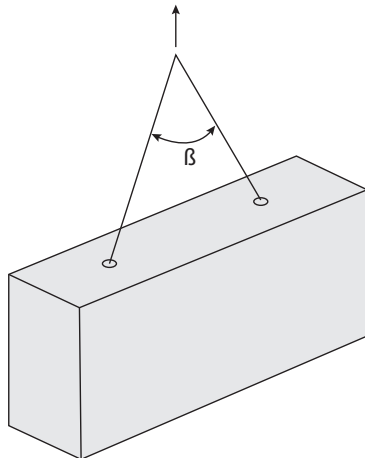
Bolt Anchors are especially suitable for slab type panels or beams. The anchor can be used to lift at compressive strengths of 15N/mm^2 and above without any further reinforcement, providing the unit has a sufficient mesh or re-bar cage with at least the minimum specification as detailed below. The socket of the Bolt Anchor is available in high grade zinc plated carbon steel and is swaged to an 8.8 grade bolt or HT set. They are available with Rd12 to Rd52 threads that have load ratings from 500kg to 4,000kg. Stainless Steel Bolt Anchors are available to special order.

All installation instructions are based on safety factors of two times the axial load rating at a strength of 15N/mm^2 at the time of first lift. All products are rigorously tested, inspected and are supplied with Declarations of Conformity with each order along with safe working instructions where applicable.

Bolt Anchors can be used in conjunction with Plastic Nailing Plates or Magnetic Holding Plates to provide a recess that can be made good on site. Plastic Stopper Caps are also available to protect threads from weathering. The standard length of Bolt Anchors available are detailed below, however special lengths are available on request. The anchors designed are for axial and angled lifts of $\beta \leq 90^\circ$.

Please contact RFA-Tech with any technical queries.

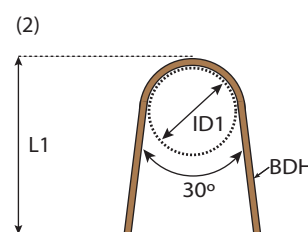
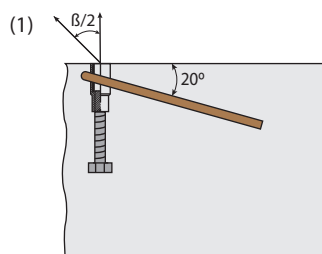
Part Code	Axial Load Rating	Size	Length L mm	Usable Thread T mm	Overall Diameter D mm
BA12070Z	500kg	Rd12	70	22	16
BA16080Z	1200kg	Rd16	80	27	21.5
BA20125Z	2000kg	Rd20	125	35	27
BA24140Z	2500kg	Rd24	140	43	32
BA30170Z	4000kg	Rd30	170	56	40



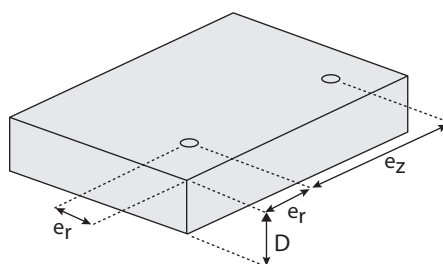
Installation - Bolt Anchors

For angled lifts it is essential to reinforce the socket to ensure the load is distributed into the concrete unit. For angles of greater than $\beta = 25^\circ$ the following reinforcement should be observed and installed in the unit. The reinforcement hanger should be to the specifications in the table below and must be reinforced with high yield reinforcement bar. All standard sling angle reduction factors apply up to a maximum of $\beta = 90^\circ$.

Axial Load Rating	Size	Min. Mesh Req.	Hanger Diameter BDH mm (2)	Leg Length L1 mm (2)	Internal Diameter ID1 mm (2)
500kg	Rd12	A142	H6	150	24
1200kg	Rd16	A142	H8	200	32
2000kg	Rd20	A193	H8	300	32
2500kg	Rd24	A193	H10	300	40
4000kg	Rd30	A193	H12	400	48



Axial Load Rating	Size	Min. Panel Thickness mm D	Edge Distance e_r mm	Edge Distance e_z mm
500kg	Rd 12	95	130	260
1200kg	Rd 16	100	155	290
2000kg	Rd 20	150	300	470
2500kg	Rd 24	160	345	510
4000kg	Rd 30	190	475	630



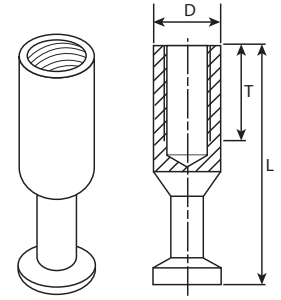
RFA-TECH CROWN ANCHORS

Crown Anchors are especially suitable for slab type panels. The anchor can be used to lift at concrete compressive strengths of 20N/mm² and above without any further reinforcement as the load is transferred into the concrete via the foot of the anchor. The product is manufactured from a solid steel blank and provides both effective transmission of lifting forces and high torque loads when used as a fixing socket. Stainless steel anchors are available to special order.

All installation instructions are based on safety factors of two times the axial load rating at a strength of 20N/mm² at the time of first lift. All products are rigorously tested, inspected and are supplied with Declarations of Conformity with each order along with safe working instructions where applicable.

Crown Anchors can be used in conjunction with Plastic Nailing Plates or Magnetic Holding Plates to provide a recess that can be made good on site. Plastic Stopper Caps to protect threads from weathering are also available. The anchors designed are for axial and angled lifts of $\beta \leq 90^\circ$. Crown Anchors can also be used in beams with additional reinforcement.

Please contact RFA-Tech with any technical queries.

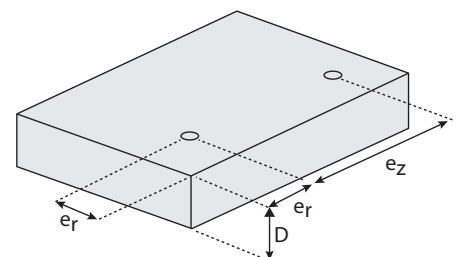
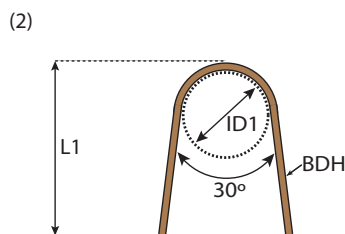
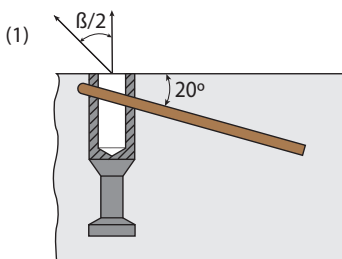


Part Code	Axial Load Rating	Size	Length L mm	Usable Thread T mm	Overall Diameter D mm
CA12060Z	500kg	Rd12	60	29	17
CA16080Z	1200kg	Rd16	80	37	21
CA20100Z	2000kg	Rd20	100	50	27
CA24115Z	2500kg	Rd24	115	65	31
CA30120Z	4000kg	Rd30	120	75	40

Installation - Crown Anchors

For angled lifts it is essential to reinforce the socket to ensure the load is distributed into the concrete unit. For angles of greater than $\beta = 25^\circ$ the following reinforcement should be observed and installed in the unit. The reinforcement hanger (2) should be to the specifications in the table below and must be high yield reinforcement bar. All standard sling angle reduction factors apply up to a maximum of $\beta = 90^\circ$.

Axial Load Rating	Size	Min. Panel Thickness (D)	Edge Distance e_r	Anchor Spacing e_z	Min. Mesh Req.	Hanger Diameter BDH mm (2)	Leg Length L1 mm (2)	Internal Diameter ID1 mm (2)
500kg	Rd 12	85	105	315	A142	H8	150	24
1200kg	Rd 16	105	120	360	A142	H8	200	32
2000kg	Rd 20	125	150	450	A193	H12	300	32
2500kg	Rd 24	140	210	620	A193	H12	300	40
4000kg	Rd 30	145	250	750	A193	H12	400	48

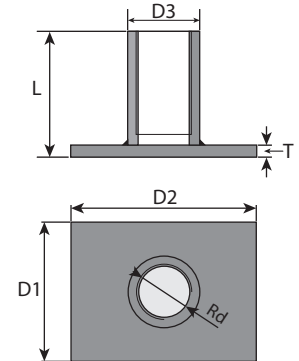


RFA-TECH FLAT PLATE ANCHORS

Flat Plate Anchors provide simple lifting and transporting for many kinds of precast concrete units, particularly when casting into thin concrete slabs. Flat Plate Anchors are available in both high grade zinc plated carbon steel and stainless steel with Rd threads. All installation instructions are based on safety factors of two times the axial load rating at a strength of 15N/mm² at the time of first lift. All products are rigorously tested, inspected and are supplied with Declarations of Conformity with each order along with safe working instructions where applicable.

Flat Plate Anchors can be used in conjunction with Plastic Nailing Plates or Magnetic Holding Plates to provide a recess that can be made good on site. Plastic Stopper Caps are available to protect threads from weathering. Please contact RFA-Tech with any technical queries.

Part Code	Axial Load Rating	Size	Overall Height L mm	Plate Width D1 mm	Plate Width D2 mm	Plate Thickness T mm	Socket Diameter D3 mm
FPRD12	500kg	Rd12	30	25	35	3	16
FPRD16	1200kg	Rd16	35	35	50	3	21.5
FPRD20	2000kg	Rd20	47	60	60	5	27
FPRD24	2500kg	Rd24	54	60	80	5	32
FPRD30	4000kg	Rd30	72	80	100	6	40
FPRD36	6300kg	Rd36	84	100	130	6	48
FPRD42	8000kg	Rd42	98	130	130	8	54
FPRD52	12500kg	Rd52	117	130	150	8	68



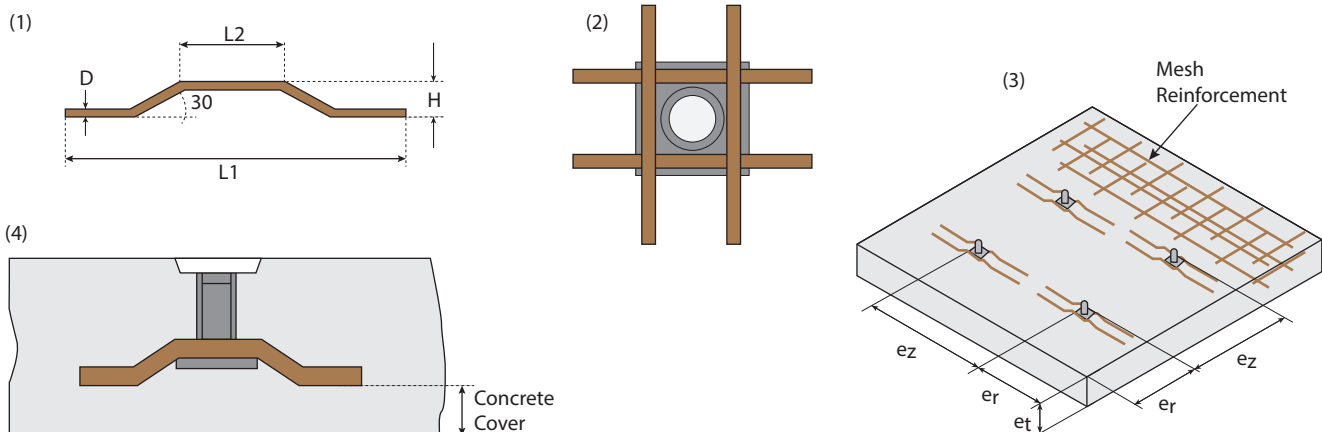
Installation Instructions

The following should be observed for all anchor installations and should also have the specific pattern of reinforcement as detailed in (1) and dimensioned per the table below.

Axial Load Rating	Size	Min. Edge Distance e_r mm	Min. Anchor Spacing e_z mm	Min. Panel Depth e_t	Min. Mesh Req.	Additional Reinforcement L1	Additional Reinforcement L2	Additional Reinforcement H	Bar Diameter D
500kg	Rd12	150	300	75	A193	250	35	35	H6
1200kg	Rd16	280	460	85	A193	420	45	45	H8
2000kg	Rd20	340	680	100	A193	640	70	50	H8
2500kg	Rd24	340	680	120	A193	640	90	60	H10
4000kg	Rd30	440	880	140	A252	830	90	65	H12
6300kg	Rd36	590	1180	160	A252	1140	110	75	H16
8000kg	Rd42	650	1300	170	A393	1250	140	75	H16
12500kg	Rd52	790	1580	200	A393	1530	140	95	H20

Depending on the application and environmental conditions, the concrete cover may need to be increased and hence enlarging the panel thickness as shown in (3). When making a recessed installation with the Plastic or Magnetic Nailing Plate (4) the minimum panel thickness must be increased by the depth of the recess.

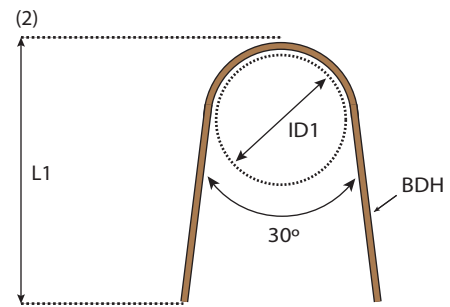
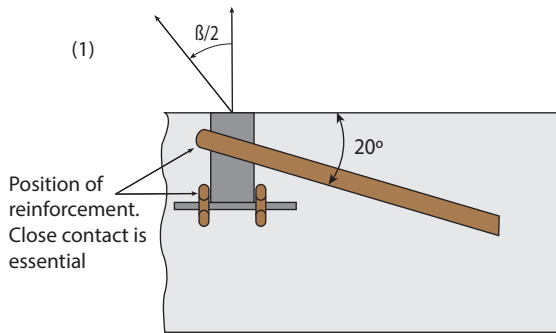
Important – Crossed bars (2) are required for Rd 24 threads and above, and reinforcement should be wired either side of the socket to ensure close contact with the plate for all sizes.



Angled Lifting

For angled lifts it is essential to reinforce the socket to ensure the load is distributed into the concrete unit. For angles of greater than $\beta = 25^\circ$ the following reinforcement should be observed and installed in the panel, as in (1). The reinforcement hanger (2) should be to the specifications in the table below and must be reinforced with high yield reinforcement bar. All standard sling angle reduction factors apply up to a maximum of $\beta = 90^\circ$.

Axial Load Rating	Size	Min. Mesh Req.	Hanger Diameter BDH (2)	Leg Length L1 mm (2)	Internal Diameter ID1 mm (2)
500kg	Rd12	A193	H6	150	24
1200kg	Rd16	A193	H8	200	32
2000kg	Rd20	A193	H8	300	32
2500kg	Rd24	A193	H10	300	40
4000kg	Rd30	A252	H12	400	48
6300kg	Rd36	A252	H16	550	56
8000kg	Rd42	A252	H16	600	64
12500kg	Rd52	A252	H20	750	140

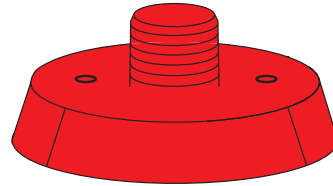


ACCESSORIES FOR THREADED INSERTS

When using the RFA-Tech Threaded Inserts, they must be correctly fixed to the formwork to ensure they are held firmly and in the correct position when pouring concrete.

Plastic Nailing Plates

For use with wooden formwork and are simply nailed to the mould in the correct position and the anchor screwed on. For security when pouring, it is advisable to tie the anchor into the mesh or re-bar cage. These are a short term, re-usable item and provide a cost effective solution. They are available in M12 to M52 threads and metric products work with Rd inserts.



Load Group	Part Codes
M8	NAILM08
M10	NAILM10
M12	NAILM12
M16	NAILM16
M20	NAILM20
M24	NAILM24
M30	NAILM30

Steel Nailing Plates

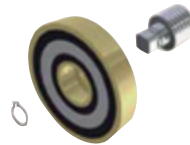
For use with wooden formwork and are simply nailed to the mould in the correct position and the anchor screwed on. For security when pouring, it is advisable to tie the anchor into the mesh or re-bar cage. These should be removed from the unit, and cleaned for re-use. They are available in M12 to M52 threads and metric products work with Rd inserts.

Steel Nailing Plates are much harder wearing than plastic and have a long usable life in the factory.

Thread	Part Codes
M8	NAILSM08
M10	NAILSM10
M12	NAILSM12
M16	NAILSM16
M20	NAILSM20
M24	NAILSM24
M30	NAILSM30

Magnetic Nailing Plates

For use with steel formwork and are attached by magnetic adhesion to the mould. The magnetic former is placed in the correct position and the anchor screwed on. The magnetic base is available in four adhesion strengths with interchangeable threaded pins for each size.



To ensure the anchor remains in position when pouring, it is advisable to tie the anchor into the mesh or re-bar cage.

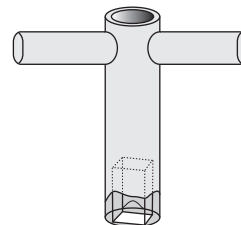
Magnets should be removed from the unit, and cleaned for re-use after casting. They are available in M12 to M30 threads and metric threads are compatible with Rd sockets.

Magnetic Formers create a recess depth of 15mm for all threads and all metric threaded formers are compatible with Rd threaded inserts. Magnets with fully welded pins are available on request.

Thread	Threaded Pin Part Code	Magnetic Base Part Code	Base Kpi	Dimensions in mm	
				Diameter	Height
M12	TPINM12	THMGB105	105	55	15
M16	TPINM16	THMGB190	190	70	15
M20	TPINM20	THMGB290	290	85	15
M24	TPINM24	THMGB450	450	105	15
M30	TPINM30				

Removal Tool for Magnetic Nailing Plate

The steel formers are removed from the mould using a square headed tool. Magnetic formers can also be produced to special order with a hexagonal head for removal with a socket set.



Removal Tool Part Code
THMAGREL

Plastic Sealer Caps

These are used to protect threads from corrosion when units are being stored. These are available in M12 to M52 threads.



Thread	Part Code
M8	SEAM08
M10	SEAM10
M12	SEAM12
M16	SEAM16
M20	SEAM20
M24	SEAM24
M30	SEAM30
M42	SEAM42
M52	SEAM52

RFA-TECH LIFTING LOOPS

Lifting Loops are a cost effective method of lifting most types of precast concrete units with all types of threaded lifting inserts.

They are manufactured from high grade steel wire swaged onto a steel ferrule, providing a strong and reliable lifting device that can be re-used, subject to being checked for damage prior to each lift.

Each loop has a tag that is marked with the thread size, safe working load, manufacturer's mark and an individual index number which corresponds to the CE Declaration of Conformity supplied with each loop.

The loops are available in either Metric or Rd threads.

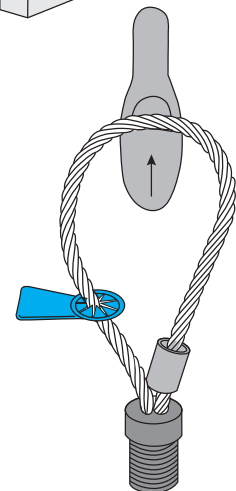
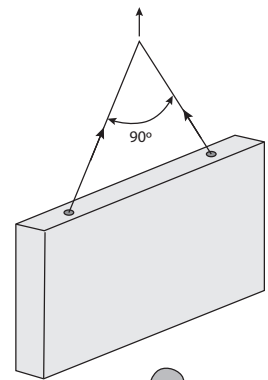
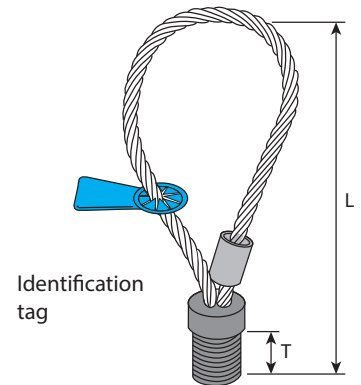
Metric Part Code	RD Part Code	Axial Load Rating	Size	Length L mm	Useable Thread T mm
LOOPM12	LOOPRD12	500kg	M/Rd 12	155	22
LOOPM16	LOOPRD16	1200kg	M/Rd 16	155	27
LOOPM20	LOOPRD20	2000kg	M/Rd 20	215	35
LOOPM24	LOOPRD24	2500kg	M/Rd 24	255	44
LOOPM30	LOOPRD30	4000kg	M/Rd 30	300	55
-	LOOPRD36	6300kg	Rd 36	360	68
-	LOOPRD42	8000kg	Rd 42	425	75
-	LOOPRD52	12500kg	Rd 52	480	95

Instructions For Use

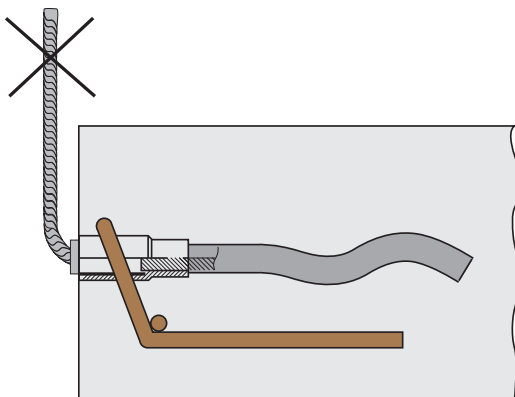
Prior to each loop being used to lift, it should be threaded into the socket until it is fully bottomed out in the socket. If dirt or ingress prevent this then the threads should be cleaned and the loop re-inserted.

Loops can be used to lift at angles of up to $\beta = 90^\circ$. Combination Lifting Loops or Swivel Eyes should be used for pitching and turning applications. Using Lifting Loops at angles greater than $\beta = 90^\circ$ can cause damage at the ferrule and excess strain on the wires causing breakages.

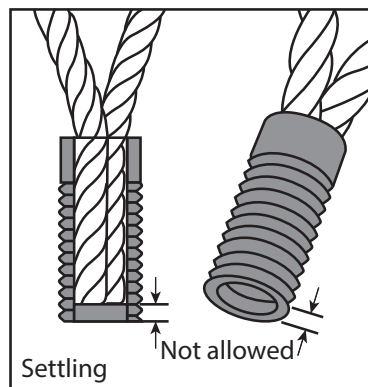
All loops must be replaced at the first sign of any broken strands, loosening of the outer layer, crushing, kinking, thread damage, corrosion, sharp bends, settling or any other damage that could affect the strength or operation of the item. Lifting Loops should be assessed by a qualified person every six months in line with LOLER regulations.



The radius of the crane hook must be at least the diameter of the wire rope.



Loops must not be used for pitching and turning units



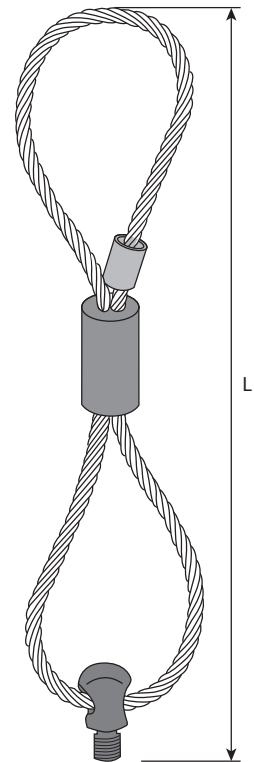
RFA-TECH COMBINATION LIFTING LOOPS

Combination Lifting Loops are manufactured from high grade steel wire swaged onto a forged steel eye, providing a strong and reliable lifting device that allows safe turning and erecting of precast units.

Each loop has a tag that is marked with the thread size, safe working load, manufacturer's mark and an individual index number which corresponds to the CE Declaration of Conformity supplied with each loop.

Combination Lifting Loops are available in either Metric or Rd threads.

Metric Part Code	RD Part Code	Axial Load Rating	Size	Length L mm	Useable Thread (B) mm
CLPM12	CLPRD12	500kg	M/Rd 12	355	22
CLPM16	CLPRD16	1200kg	M/Rd 16	385	27
CLPM20	CLPRD20	2000kg	M/Rd 20	470	35
CLPM24	CLPRD24	2500kg	M/Rd 24	550	37
CLPM30	CLPRD30	4000kg	M/Rd 30	590	50
-	CLPRD36	6300kg	Rd 36	780	65
-	CLPRD42	8000kg	Rd 42	860	70
-	CLPRD52	12500kg	Rd 52	1080	80



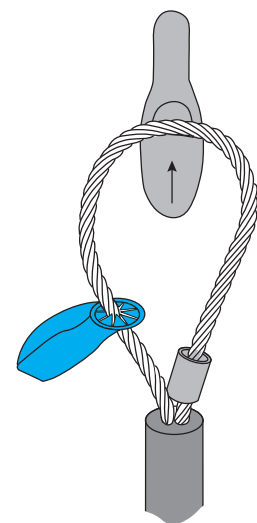
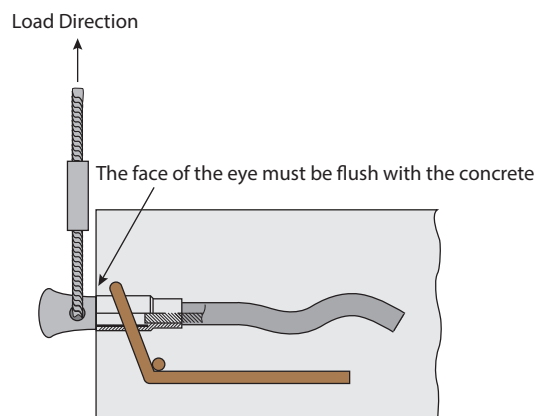
Instructions For Use

Prior to each loop being used to lift, it should be threaded into the socket until it is fully bottomed out in the socket. If dirt or ingress prevent this then the threads should be cleaned and the loop re-inserted.

Loops can be used to lift in axial loads and right angles for pitching / turning units.

All loops must be replaced at the first sign of any broken strands, loosening of the outer layer, crushing, kinking, thread damage, corrosion, sharp bends, or any other damage that could affect the strength or operation of the item. There should be at least half the diameter visibly protruding from each end of the ferrule at cut ends of the wire rope. Should any slipping occur that reduces this then discard and take the loop out of service. Combination Lifting Loops should be assessed by a qualified person every six months in line with LOLER regulations.

Once the concrete units have been pitched to an upright position Combination Lifting Loops are suitable for axial and angled lifting, providing the correct reinforcement has been installed and that the correct angle limits are observed.



The radius of the crane hook must be at least the diameter of the wire rope.

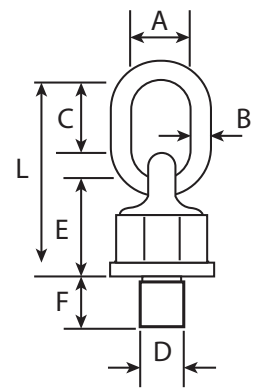
RFA-TECH SWIVEL LIFTING EYES

Swivel Lifting Eyes are a cost effective method of lifting most types of precast concrete units with all types of threaded lifting inserts. They are especially useful for pitching and turning units, and for high volume lifting on site or in the factory where wire rope lifting devices can wear out quickly.

They are manufactured from high grade steel, which provides a strong and reliable lifting device that can be re-used repeatedly subject to being checked for damage prior to each lift.

Each eye is marked with the safe working load, manufacturer's production batch marks, angle guides and an individual index number which can be found on the CE Declaration of Conformity supplied with each item. The eyes are available in Metric threads.

Part Code	Thread Size	SWL KG	A mm	B mm	C mm	D mm	E mm	F mm	L mm	Spanner Width mm
SEB12	M12	500	30	13	46	12	50	18	105	30
SEB16	M16	1400	30	16	46	16	50	20	105	30
SEB20	M20	2000	34	16	57	20	61	30	131	40
SEB24	M24	3000	40	19	70	24	68	30	153	48
SEB30	M30	5000	40	20	65	30	80	35	165	65
SEB36	M36	8000	50	22	90	36	95	54	205	75
SEB42	M42	10000	50	22	90	42	95	63	205	75
SEB52	M52	12500	70	30	120	52	130	78	280	95



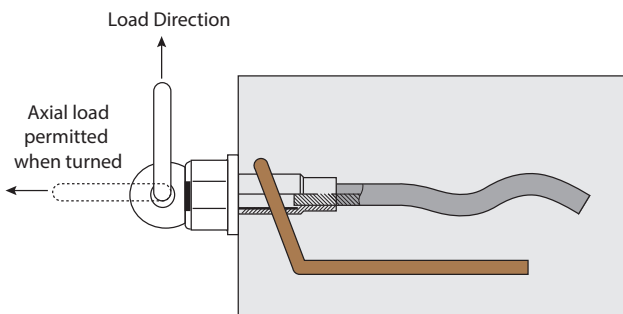
Instructions For Use

Prior to each Swivel Lifting Eye being used to lift, it should be threaded fully into the socket until the face of the eye is flush to the face of the concrete and hand tightened with a spanner. If dirt or ingress prevent this then the threads should be cleaned and the eye re-inserted.

Swivel Lifting Eyes can be used in axial loads and at angles of up to 90° for pitching / turning units. The base of the eye rotates freely through 360° under load.

Swivel Lifting Eyes should be examined for damage before each lift, paying particular attention to the threads, crane hook eye, and general wear and tear. Wear on the ball bearings can be easily recognised by any play in the swivel mechanism. Replace worn out swivel eyes as soon as this is visible.

Swivel Lifting Eyes must be assessed by a qualified person every six months in line with LOLER regulations.



RFA-TECH POLYPROPYLENE CAST IN LOOPS

Polypropylene Cast In Loops are a cost effective method of lifting lightweight concrete units and provide a crane hook attachment that can be cut off once used.

Product Details

These are produced from polypropylene rope with a swaged aluminium ferrule to create a loop which is tagged with the manufacturer's mark, CE mark and the appropriate load rating. They are designed for use for de-moulding, transportation and fixing only, and should not be used more than one such cycle.

The loops are available in load ratings from 150kg to 1200kg and should be selected according to the lifting design considerations detailed in pages 4 and 5 of this catalogue.

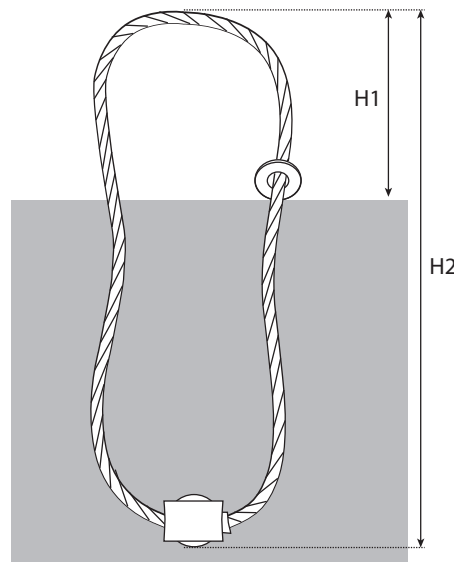
These items can be used with concrete strengths above 15N/mm² for axial or angled lifts and for pitching at 20N/mm² and above. When pitching, the safe working load is reduced by 50%.

Polypropylene Installation

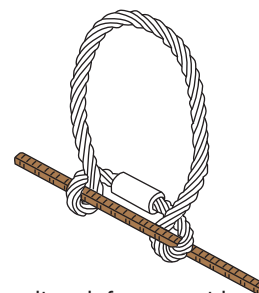
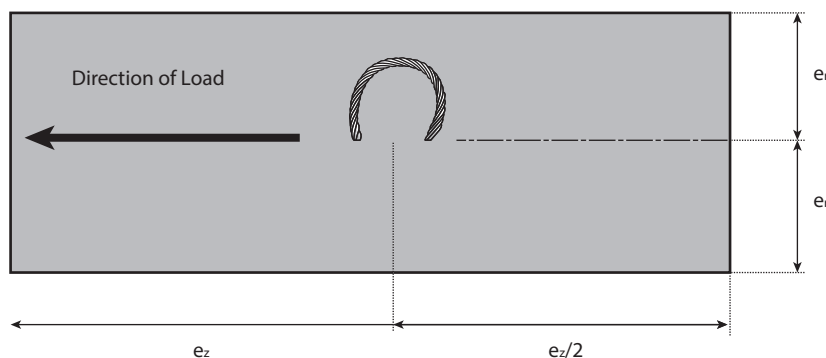
Cast In Loops should be installed in the direction of the load, with the ferrule in the opposite direction. They should be positioned around the centre of gravity in a manner that will give a balanced load, making sure that the minimum dimensions are observed as set out in the table below. It may be necessary to use reinforcement bar for thin units, which should be looped as shown below.

When lifting it is essential that the curvature of crane hook is at least the diameter of the loop.

Please contact RFA-Tech with any technical queries.



Part Code	Load Rating kg	Exposed Height H1 mm	Cast In Height H2 mm	Rope Dia. mm	Edge Distance e_z mm	Min Edge Distance e_r mm
POLY150	150	100	160	6	200	40
POLY250	250	100	160	8	200	50
POLY350	350	100	200	10	300	60
POLY500	500	100	200	12	300	70
POLY875	875	120	240	14	400	80
POLY1200	1200	120	240	16	450	100



For thin units reinforcement bar should be used as shown above.

RFA-TECH CAST-IN CONCRETE LIFTING LOOPS

Cast-In Concrete Lifting Loops are used for lifting many types of precast concrete units quickly and safely by use of a crane hook. They provide a quick installation when casting and can easily be cut off once in position. However, it should be noted that the remaining ends can rust and hence stain if not properly concealed.

Providing the following reinforcement details are observed, no further reinforcement is required under normal circumstances. The standard sling angle factors and dynamic loads detailed in pages 4 and 5 apply up to a sling angle of $\beta=60^\circ$. For any lifting angles greater than $\beta=60^\circ$, please contact RFA-Tech. All installation instructions are based on a minimum compressive concrete strength of 15N/mm^2 . However, installation detailed are provided for up to 30N/mm^2 for use in prestressed units such as bridge beams where the concrete strength is higher.

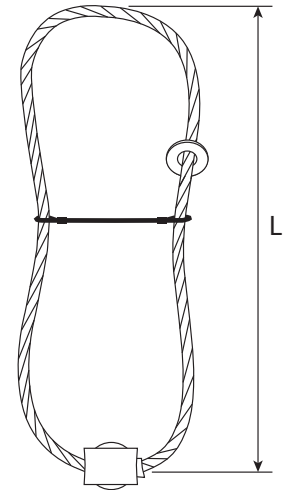
The loops are manufactured from galvanised steel wire with identification tags showing the manufacturer's name, CE mark and load rating. This product is not designed for repeated use and should only be used for lifting from factory to site and final installation.

The loops should be selected correctly dependent on the size of the concrete unit, taking all lifting factors into account. Please contact RFA-Tech with any technical queries.

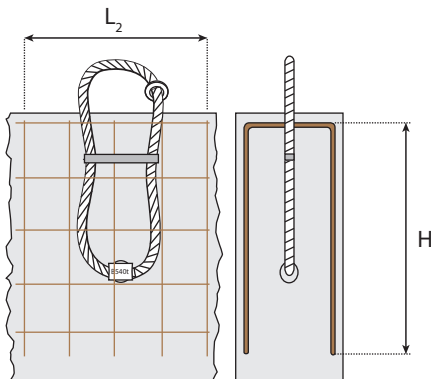
Installation Instructions

To ensure a safe lift, the following edge distances and mesh requirements must be observed.

Part Code	Axial Load Rating Kg	Length L mm	Wire Diameter mm	Necessary Mesh Reinforcement	Length Reinforcement L_2 mm	Height of Reinforcement Stirrups H mm
CIL08	800	200	6	A142	450	300
CIL12	1200	220	7	A142	500	350
CIL16	1600	230	8	A142	550	350
CIL20	2000	255	9	A193	650	450
CIL25	2500	280	10	A193	700	500
CIL40	4000	330	12	A193	800	550
CIL52	5200	385	14	A193	850	550
CIL63	6300	385	16	A193	950	600
CIL80	8000	430	18	A252	1050	700
CIL100	10000	470	20	A252	1200	800
CIL125	12500	510	22	A252	1300	900
CIL160	16000	560	26	A252	1500	1000
CIL200	20000	610	28	A393	1700	1150
CIL250	25000	670	32	A393	1950	1300



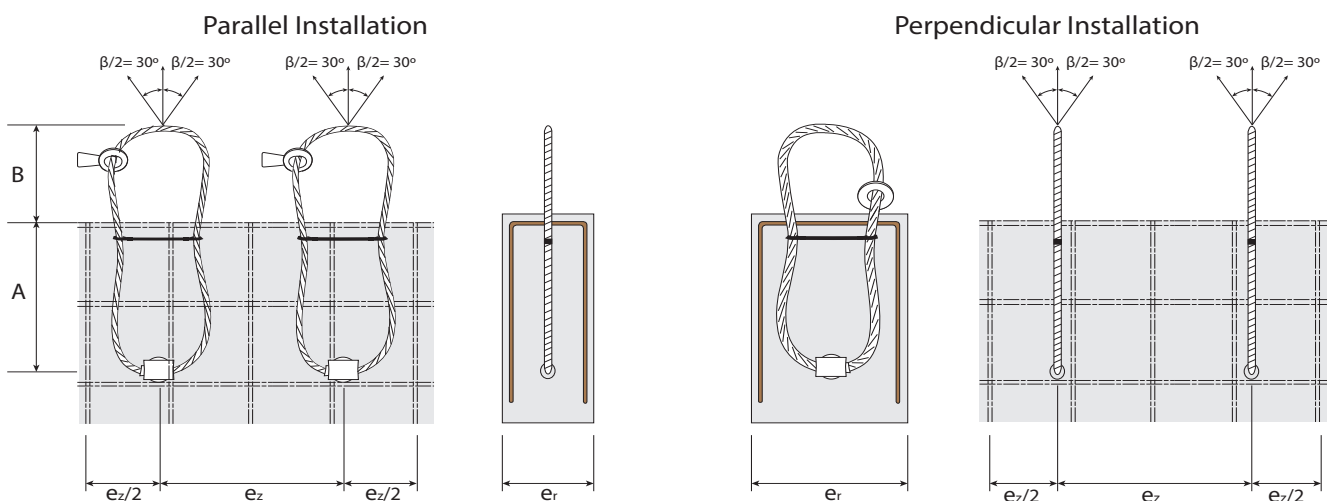
When lifting it is essential that the curvature of crane hook is at least the diameter of the loop. For load capacities over 10.0t the crane hook should be a minimum of five times the rope diameter.



Prior to installation it is essential to check each loop carefully for broken strands, corrosion, pinched wire or any other damage that could compromise the strength of the product. Discard any such damaged loops immediately.

For most applications the loops should be installed parallel to the face of the unit, with the minimum edge distances and anchor spacings adhered to. They can be installed at right angles to the face but the panel thickness must be increased accordingly.

Axial Load Rating Kg	Embedment A mm	Exposed Section B mm	Parallel Installation			Perpendicular Installation		
			Min. Wall Thickness e_r		Min. Anchor Spacing e_z mm	Min. Wall Thickness e_r		Min. Anchor Spacing e_z mm
			15N/mm ²	30N/mm ²		15N/mm ²	30N/mm ²	
800	140	60	70	50	540	135	135	540
1200	155	65	90	60	620	140	140	620
1600	165	70	120	80	700	170	170	700
2000	175	80	140	100	840	175	175	840
2500	195	85	160	110	900	180	180	900
4000	230	100	220	150	1000	220	220	1000
5200	285	100	290	200	1040	290	220	1040
6300	270	115	320	220	1160	320	275	1160
8000	300	130	400	280	1300	400	280	1300
10000	330	140	440	310	1460	440	310	1460
12500	360	150	560	390	1620	560	390	1620
16000	390	170	620	430	1860	620	430	1860
20000	430	180	680	480	2120	680	480	2120
25000	470	200	750	530	2420	750	530	2420



RFA-TECH RIGHT ANGLED LIFTING LOOPS

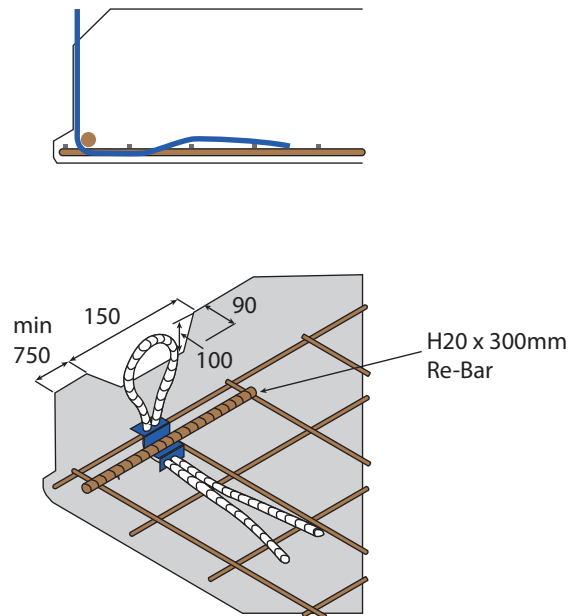
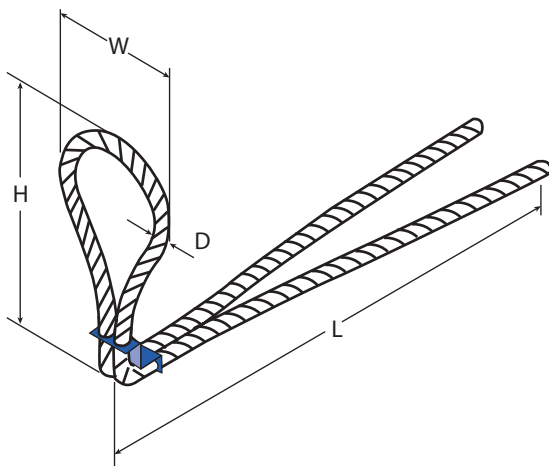
Angled Lifting Loops are used for lifting concrete slabs and floor panels. An H20 x 300mm straight re-bar must be positioned in the corner of the angle to ensure safe and effective load distribution.

A notch must be formed at the top of the concrete to ensure enough space to pass the crane hook through the loop.

When lifting it is essential that the curvature of crane hook is at least the diameter of the loop.

Please contact RFA-Tech with any technical queries.

Part Code	SWL t	Dimensions (m)			
		W	D	L	H
RAL1.6	1.6	70	8	300	120
RAL2.5	2.5	90	10	360	200
RAL4.0	4.0	105	12	280	235
RAL5.2	5.2	105	14	490	235



The loops are manufactured from galvanised steel wire with identification tags showing the manufacturer's name, CE mark and load rating. This product is not designed for repeated use and should only be used for lifting from factory to site and final installation.

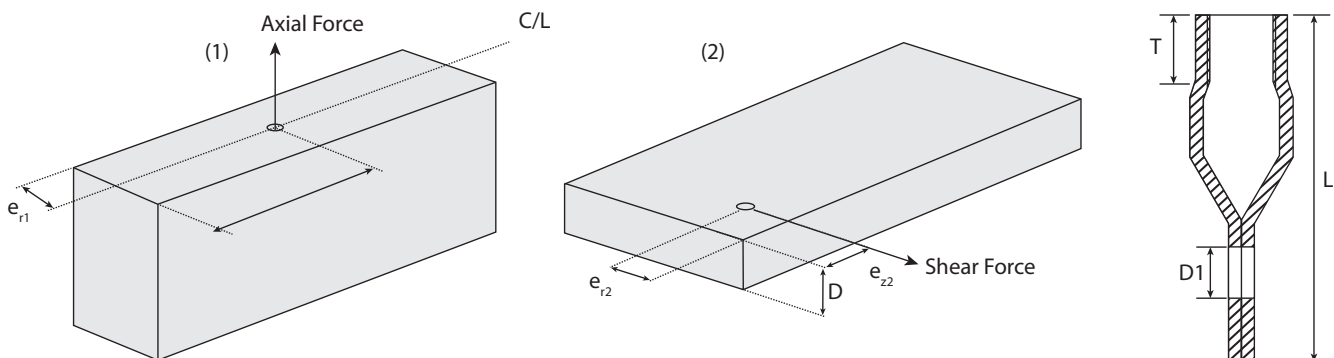
The loops should be selected correctly dependent on the size of the concrete unit, taking all lifting factors into account. Please contact RFA-Tech with any technical queries.

RFA-TECH FIXING INSERTS WITH CROSS HOLE

Fixing Inserts with Cross Hole provide a threaded fixing system in cast concrete with a strength of 30N/mm² and above. They are effective for a single point fixing where no tolerance for attaching is required. They are manufactured from either zinc plated high grade carbon steel or stainless steel tube.

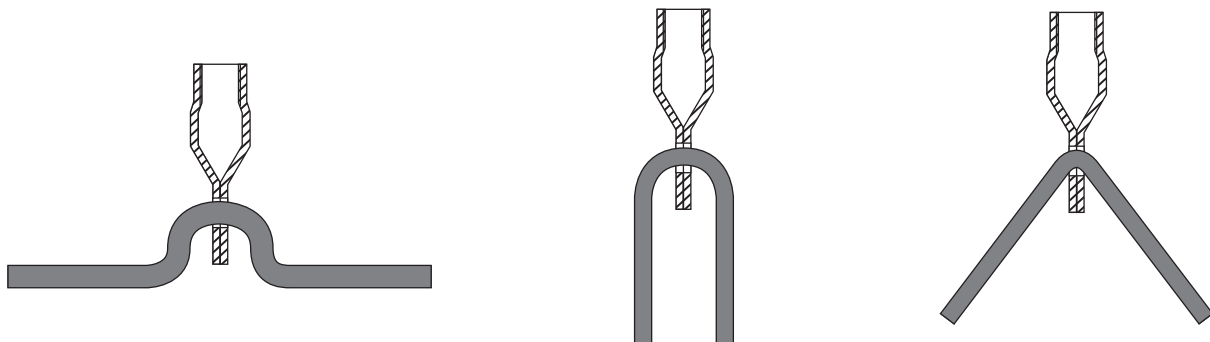
Fixing Inserts can be used in conjunction with Plastic Nailing Plates or Magnetic Holding Plates to provide a recess that can be made good on site. Plastic Stopper Caps are also available to protect threads from weathering. Please contact RFA-Tech with any technical queries.

Part Code Zinc Plated	Part Code Stainless Steel	Axial Load Rating F Kg	Thread	Length L mm	Rebar Hole Size D1 mm	Usable Thread Length T mm	Edge Distance e ₁ mm Axial Force F Kg	Edge Distance e ₂ mm Axial Force F Kg	Edge Distance e ₂ mm Shear Force F Kg	Edge Distance e ₂ mm Shear Force F Kg	Min Panel Depth D mm	Re-Bar Diameter mm	Min Unbent Re-Bar Length mm
9G06035Z	9G06035S	150	M6	35	8	8	60	60	80	80	60	6	320
9G08040Z	9G08040S	200	M8	40	10	10	60	60	80	80	65	6	320
9G01050Z	9G01050S	350	M10	50	10	10	75	75	100	100	75	8	540
9G12060Z	9G12060S	500	M12	60	10	12	90	90	120	120	90	8	540
9G16070Z	9G16070S	700	M16	70	12.5	16	105	105	140	140	95	10	650
9G16080Z	9G16080S	800	M16	80	12.5	16	120	120	160	160	105	10	650
9G16100Z	9G16100S	1000	M16	100	12.5	16	150	150	200	200	125	10	650
9G16120Z	9G16120S	1200	M16	120	12.5	16	180	180	240	240	145	10	650
9G20100Z	9G20100S	1250	M20	100	15.5	20	150	150	200	200	125	12	770
9G20120Z	9G20120S	1400	M20	120	15.5	20	180	180	240	240	145	12	770
9G24120Z	9G24120S	1800	M24	120	15.5	24	180	180	240	240	145	12	880



Installation Instructions

For all sizes above M6 a high yield reinforcement tail bar must be used to ensure anchorage in the concrete, and should be fitted inside a re-bar cage befitting the unit as specified by the design engineer. All bar sizes and minimum edge distances in the table above should be observed. The pattern of reinforcement bar bending can be tailored to the unit, examples of suitable patterns are shown below. Permissible safe working loads are based upon a safety factor of approximately three times the safe working load. Providing the minimum edge distances are observed, Fixing Inserts have the same working load in shear as in axial.



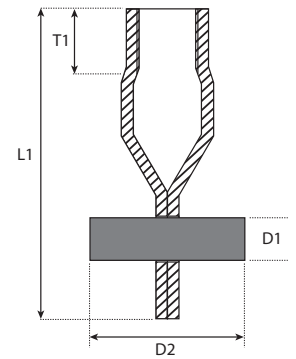
RFA-TECH FIXING INSERTS WITH CROSS PIN AND RIGHT ANGLE

Fixing Inserts with Cross Pin or Right Angle provide a cost effective threaded fixing system in cast concrete with strength of 30N/mm² and above, where either the unit or speed of installation required does not permit the use of a high yield reinforcement tail bar. They are effective for a single point fixing where no tolerance is required for attachment.

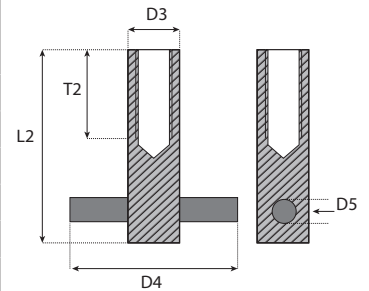
They are manufactured from either high grade zinc plated mild or stainless steel tube for light duty, and solid bar for heavy duty use dependent on the application required. These Inserts can be used in conjunction with Plastic Nailing Plates or Magnetic Holding Plates to provide a recess that can be made good on site. Plastic Stopper Caps are also available to protect threads from weathering.

Please contact RFA-Tech with any technical queries.

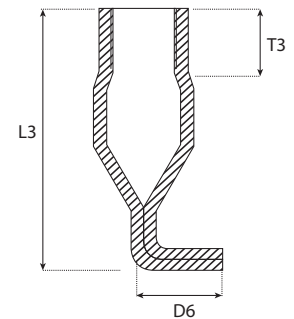
Light Duty Fixing Inserts with Cross Pin							
Part Code Zinc Plated	Part Code Stainless Steel	Axial Load Rating	Thread	Length L1 mm	Usable Thread Length T1 mm	Bar Diameter D1 mm	Bar Length D2 mm
995A08Z	995A08S	200kg	M8	40	8	6	40
995A10Z	995A10S	350kg	M10	50	10	6	40
995A12Z	995A12S	500kg	M12	60	12	8	50
995A16Z	995A16S	700kg	M16	80	16	10	80
995A161Z	995A161S	800kg	M16	100	16	10	80
995A20Z	995A20S	1200kg	M20	100	20	12	100
995A24Z	995A24S	1800kg	M24	120	24	12	100



Heavy Duty Fixing Inserts with Cross Pin									
Part Code Zinc Plated	Part Code Stainless Steel	Axial Load Rating	Shear Load Rating	Thread	Length L2 mm	Usable Thread Length T2 mm	Diameter D3 mm	Bar Length D4 mm	Bar Diameter D5 mm
1074A10Z	1074A10S	600kg	400kg	M10	60	35	16	50	6
1074A12Z	1074A12S	900kg	560kg	M12	50	20	20	75	10
1074A27Z	1074A27S	900kg	560kg	M12	75	40	20	75	10
1074A16Z	1074A16S	1700kg	1100kg	M16	75	40	22	75	10
1074A20Z	1074A20S	2300kg	1700kg	M20	75	35	25	90	12
1074A24Z	1074A24S	3000kg	2400kg	M24	100	55	35	100	16
1074A30Z	1074A30S	6000kg	3800kg	M30	125	60	50	120	25



Right Angled Fixing Insert					
Part Code Zinc Plated	Axial Load Rating	Thread	Length L3 mm	Thread Embedment T mm	Angle Length D6 mm
11400850	300kg	M8	50	8	20
11401060	500kg	M10	60	10	25
11401245	400kg	M12	45	12	25
11401270	700kg	M12	70	12	30
11401660	700kg	M16	60	16	30
11401610	1200kg	M16	100	16	35
11402070	800kg	M20	70	20	35
11402010	1250kg	M20	100	20	35
11402480	1200kg	M24	80	24	35



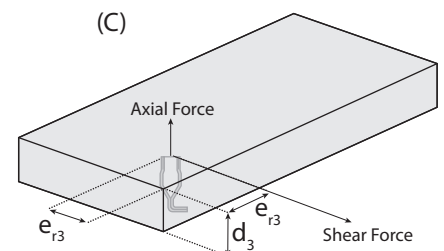
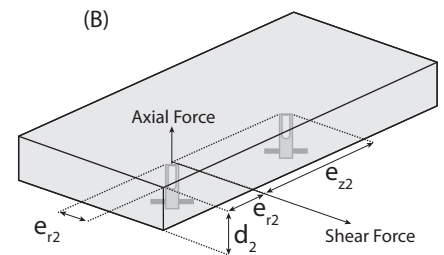
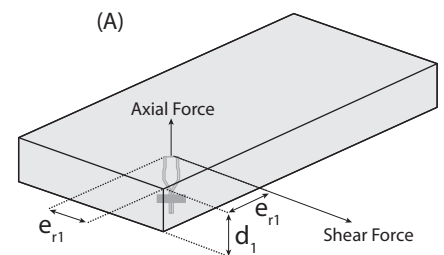
Installation Instructions

All Fixing Inserts with Cross Pin or Right Angle should be fitted inside a re-bar cage befitting the unit as specified by the design engineer, and should observe the edge distances as detailed in the table below. The safe working loads are based upon a three and a half times the axial load capacity, provided a minimum concrete strength of 30N/mm² has been achieved. The following edge distances should be observed.

Light Duty Fixing Insert with Cross Pin (A)					
Axial Load Rating Kg	Thread	Anchor Length L1	Axial Force Edge Distance e_{r1} mm	Shear Force Edge Distance e_{r2} mm	Min. Panel Depth d_1 mm
200	M8	40	60	125	65
350	M10	50	75	150	75
500	M12	60	90	125	85
700	M16	80	120	175	105
800	M16	100	150	150	125
1200	M20	100	150	250	125
1800	M24	120	180	200	145

Heavy Duty Fixing Inserts with Cross Pin (B)							
Axial Load Rating	Shear Load Rating	Thread	Anchor Length (mm)	Edge Distance e_{r2} mm	Edge Distance e_{r2} mm	Minimum Anchor Spacing e_{z2} mm	Min Panel Depth d_2 mm
600kg	400kg	M10	60	75	75	150	85
900kg	560kg	M12	50	75	75	150	75
900kg	560kg	M12	75	75	75	150	100
1700kg	1100kg	M16	75	75	75	150	100
2300kg	1700kg	M20	75	75	75	150	100
3000kg	2400kg	M24	100	100	100	200	125
6000kg	3800kg	M30	125	125	125	250	150

Right Angled Fixing Insert (C)					
Axial Load Rating	Thread	Anchor Length mm	Axial Force Edge Distance e_{r3} mm	Shear Force Edge Distance e_{r3} mm	Min Panel Depth d_3 mm
300kg	M8	50	60	125	75
500kg	M10	60	75	150	85
400kg	M12	45	90	125	70
700kg	M12	70	90	175	95
700kg	M16	60	120	150	85
1200kg	M16	100	120	250	125
800kg	M20	70	150	175	105
1250kg	M20	100	150	250	125
1200kg	M24	120	180	200	105



RFA-TECH SPREAD ANCHOR LIFTING SYSTEMS

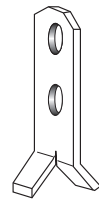
The RFA-Tech range of Spread Anchors provide a simple and effective system for lifting most types of precast concrete units. The anchors, manufactured from high grade steel, provide safe and secure lifting. There is an anchor type to suit almost all precast units and they are rigorously tested, inspected and are supplied with Declarations of Conformity with each order along with safe working instructions where applicable.

Anchor Selection

The following anchors are available:

Spread Anchors

The most versatile of the anchors and are suitable for lifting most types of beams, wall panels and slabs. The second hole provides the option to use extra reinforcement where required. These are available in safe working loads from 0.7t to 26.0t.



Two Hole Anchors

Two Hole Anchors are suitable for use where load distribution is not possible through the foot of a spread anchor and is done so by use of a reinforcement tail bar. They are particularly useful in thin wall panels and trusses, or where concrete strength is low. These are available in safe working loads from 0.7t to 22.0t.



Erection / Unilateral Erection Anchors

These anchors are specifically designed for pitching and turning concrete units. They have specially designed nibs on the head of the anchor which prevent concrete from spalling when turning units. They are notched to accommodate extra reinforcement required for pitching and are available in safe working loads from 1.4t to 22.0t.

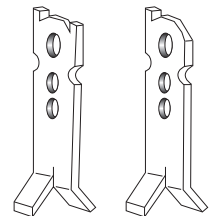
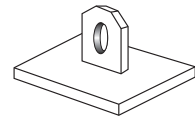


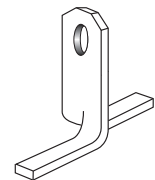
Plate Anchors

These anchors are used for very thin slabs and additional reinforcement is essential. They are available in safe working loads from 1.4t to 10.0t.



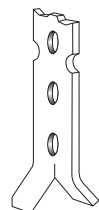
Flat Foot Anchors

These anchors are similar in use to the Plate Anchor. They are used for thin slabs and additional reinforcement is essential. They are available in safe working loads from 1.4t to 22.0t.



Universal Anchors

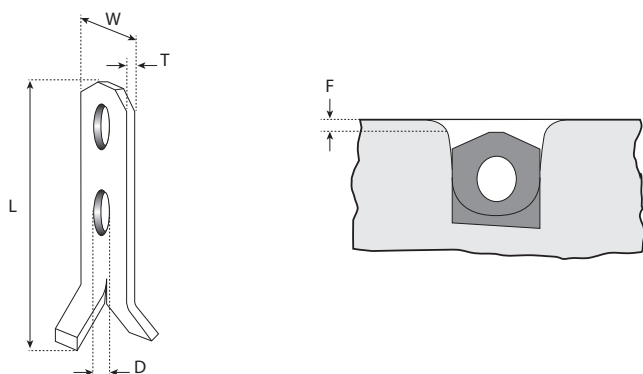
These anchors are for light duty applications and combine the benefits of Two Hole, Erection and Spread Anchors. They are available in 1.25t only and use a former and Ring Clutch specific to this load group. They are suitable for small precast units or where a small recess is required.



RFA-TECH SPREAD ANCHOR INSTALLATION INSTRUCTIONS

Anchor Specifications

Part Code Self Colour	Part Code Galvanised	Axial Load Rating t	Anchor Length L mm	Anchor Width W mm	Anchor Thickness T mm	Re-Bar Hole Dia. D mm	Recess to Anchor Head F mm
SA07110	SA07110G	0.7	110	30	5	14	10
SA1.4110	SA14110G	1.4	110	30	6	14	10
SA1.4160	SA14160G	1.4	160	30	6	14	10
SA2.0130	SA20130G	2.0	130	30	8	14	10
SA2.0160	SA20160G	2.0	160	30	8	14	10
SA2.0210	SA20210G	2.0	210	30	8	14	10
SA2.5150	SA25150G	2.5	150	30	10	14	10
SA2.5200	SA25200G	2.5	250	30	10	14	10
SA2.5250	SA2.5250G	2.5	200	30	10	14	10
SA3.0160	SA30160G	3.0	160	40	10	18	10
SA3.0200	SA3.0200G	3.0	200	40	10	18	10
SA3.0280	SA30280G	3.0	280	40	10	18	10
SA4.0180	SA40180G	4.0	180	40	12	18	10
SA4.0240	SA40240G	4.0	240	40	12	18	10
SA4.0320	SA40320G	4.0	320	40	12	18	10
SA5.0180	SA50180G	5.0	180	40	15	18	10
SA5.0240	SA50240G	5.0	240	40	15	18	10
SA5.0400	SA50400G	5.0	400	40	15	18	10
SA7.5260	SA75260G	7.5	260	60	16	26	15
SA7.5300	SA75300G	7.5	300	60	16	26	15
SA7.5420	SA75420G	7.5	420	60	16	26	15
SA10300	SA10300G	10.0	300	60	20	26	15
SA10370	SA10370G	10.0	370	60	20	26	15
SA10520	SA10520G	10.0	520	60	20	26	15
SA14370	SA14370G	14.0	370	80	20	35	15
SA14460	SA14460G	14.0	460	80	20	35	15
SA22500	SA22500G	22.0	500	90	28	35	15
SA22620	SA22620G	22.0	620	90	28	35	15



Spread anchors are available in black, zinc plated, galvanised steel or stainless steel.
Special sizes and hole positions are available to order.

Load capacity and installation dimensions for large-area (slabs) or thick-walled precast units

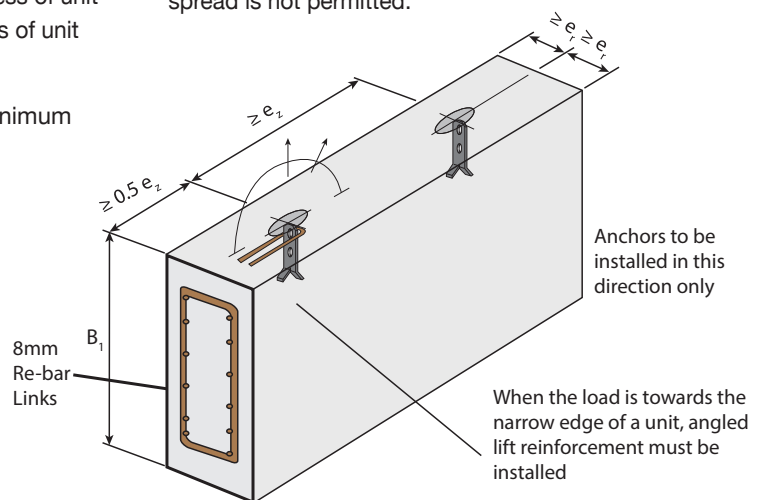
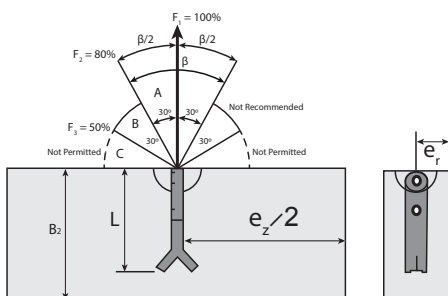
Load Rating t	Anchor Length L mm	Axial Load Capacity kN	Min Height of walls	Minimum Edge Distances Walls e_r			Min Depth of Slab (25mm Cover) mm	Minimum Edge Distances Slabs e_r			Min. Spaces Between Centres e_z mm
				for f_{ck} 15 N/mm ² mm	for f_{ck} 25 N/mm ² mm	for f_{ck} 35 N/mm ² mm		for 15 N/mm ² mm	for 25 N/mm ² mm	for 35 N/mm ² mm	
0.7	110	7	200	35	35	35	145	35	35	35	280
1.4	110	14	190	55	40	35	145	70	50	40	380
1.4	160	14	290	35	35	35	195	50	35	35	530
2.0	130	20	225	75	55	45	165	100	70	55	450
2.0	160	20	285	60	40	35	195	80	60	45	570
2.0	210	20	385	45	35	35	245	65	45	35	770
2.5	150	25	260	90	65	50	185	120	85	70	520
2.5	200	25	360	65	45	35	235	90	65	50	720
2.5	250	25	460	50	35	35	285	75	50	40	920
3.0	160	30	275	105	75	60	195	145	100	80	550
3.0	200	30	350	80	60	45	235	115	85	65	710
3.0	280	30	510	55	40	40	315	85	60	50	1025
4.0	180	40	310	140	100	80	215	190	135	105	610
4.0	240	40	425	100	70	55	275	145	100	80	850
4.0	320	40	590	70	50	40	355	110	75	60	1175
5.0	180	50	300	190	135	110	215	260	180	145	600
5.0	240	50	420	135	95	75	275	195	140	110	840
5.0	400	50	740	75	55	45	435	115	85	65	1480
7.5	260	75	450	210	150	120	300	300	215	175	900
7.5	300	75	530	180	125	100	340	265	190	150	1060
7.5	420	75	770	120	85	70	460	190	135	110	1540
10.0	300	100	515	270	190	150	340	390	275	220	1030
10.0	370	100	655	210	150	120	410	315	225	180	1310
10.0	520	100	955	140	100	80	560	225	160	130	1910
14.0	370	140	615	350	250	200	410	500	355	285	1230
14.0	460	140	795	265	190	150	500	400	285	230	1590
22.0	500	220	850	450	320	260	540	275	480	385	1700
22.0	620	220	1090	350	250	200	660	540	385	310	2180

(A) Angled lift at $30^\circ < \beta/2 \leq 60^\circ$ without angle lift reinforcement only allowed when:
 Concrete Strength $\geq 15\text{N/mm}^2 + 3$ times min. thickness of unit
 Concrete Strength $\geq 25\text{N/mm}^2 + 2.5$ times min. thickness of unit
 Concrete Strength $\geq 35\text{N/mm}^2 + 2$ times min. thickness of unit
 (min thickness of unit = $2 \times e_r$)

(B) Where concrete strength $\geq 25\text{N/mm}^2$ F_2 can be taken as 100%

(C) Angle of $\beta/2 \geq 60^\circ$ due to cable spread is not permitted.

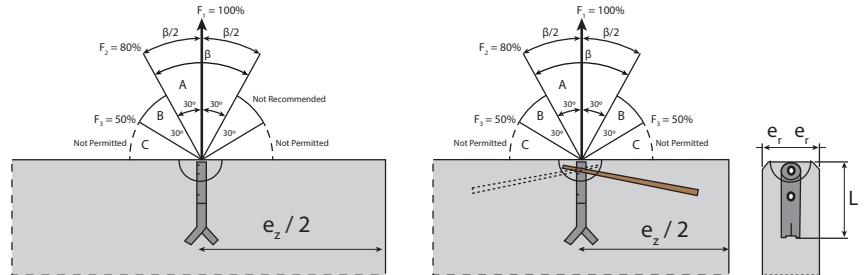
Straight line interpolation can be assumed between minimum height B_1 and minimum slab thickness B_2



LOAD CAPACITY AND INSTALLATION DIMENSIONS FOR THIN WALLED PRECAST UNITS

(A) Lifting without angle lift reinforcement

only allowed when:
 Concrete Strength $\geq 15\text{N/mm}^2 + 3$ times min. thickness of unit
 Concrete Strength $\geq 25\text{N/mm}^2 + 2.5$ times min. thickness of unit
 Concrete Strength $\geq 35\text{N/mm}^2 + 2$ times min. thickness of unit
 (min thickness of unit = $2 \times e_1$)



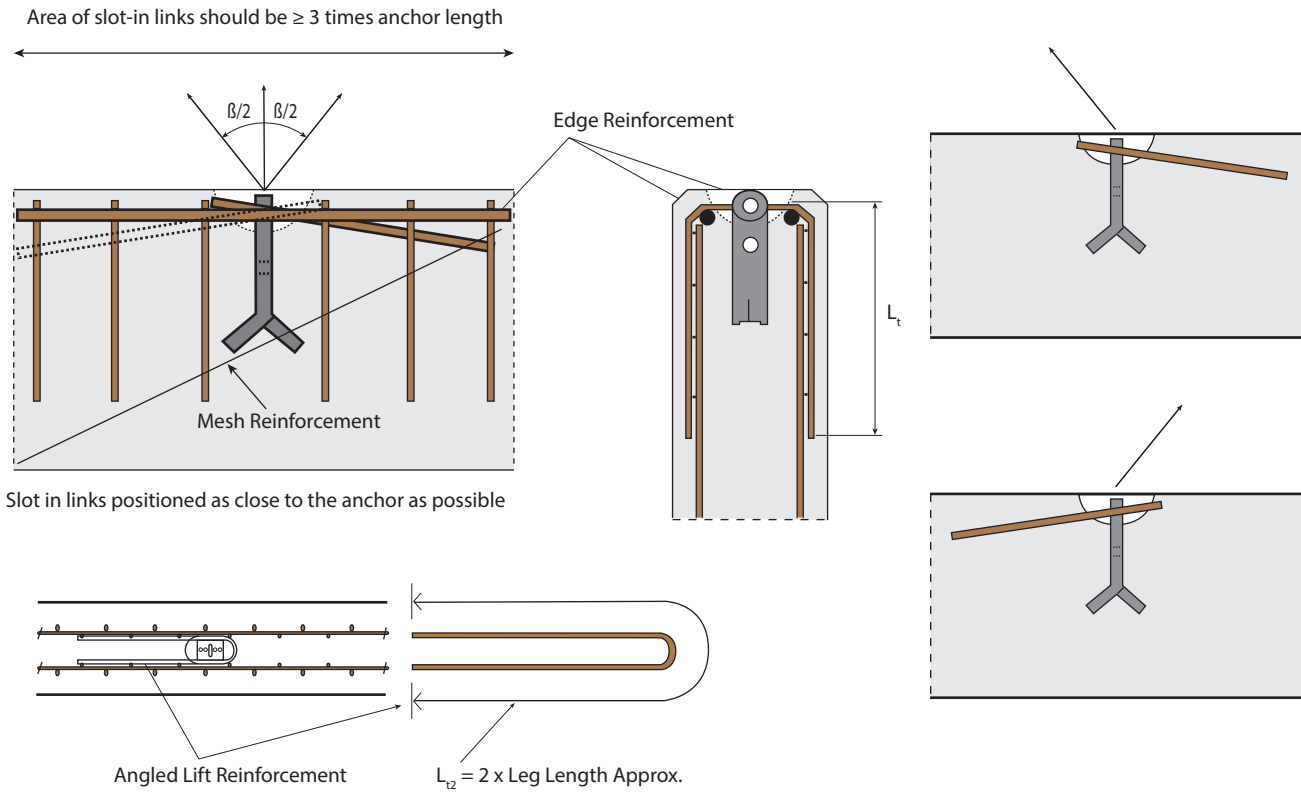
(B) Where concrete strength $\geq 25\text{N/mm}^2$ F_2 can be taken as 100%

(C) Angle of $B/2 \geq 120^\circ$ due to chain or cable spread angle is not permitted.

Load Capacity and Minimum Edge Distances

Load Rating t	Anchor length L mm	Spacing Between Anchor Centres min. e_z mm	Min. Thickness of Precast Unit ($2 \times e_1$)			100% F1	80% F2
			for 15 N/mm ²	for 25 N/mm ²	for 35 N/mm ²	Axial Lift ($B/2 \leq 30^\circ$)	Angled Lift ($B/2 > 30^\circ$)
			mm	mm	mm	kN	kN
0.7	110	330	60	60	60	7	5.6
1.4	110	330	75	60	60	14	11.2
1.4	160	480	75	60	60	14	11.2
2.0	130	390	100	80	70	20	16.0
2.0	160	480	100	80	70	20	16.0
2.0	210	630	100	80	70	20	16.0
2.5	150	450	120	90	80	25	20.0
2.5	200	600	120	90	80	25	20.0
2.5	250	750	120	90	80	25	20.0
3.0	160	480	160	90	80	30	24.0
3.0	200	600	120	90	80	30	24.0
3.0	280	840	120	90	80	30	24.0
4.0	180	540	210	130	100	40	32.0
4.0	240	720	150	115	100	40	32.0
4.0	320	960	150	115	100	40	32.0
5.0	180	540	350	210	150	50	40.0
5.0	240	720	180	140	120	50	40.0
5.0	400	1200	180	140	120	50	40.0
7.5	260	780	340	200	150	75	60.0
7.5	300	900	240	150	130	75	60.0
7.5	420	1260	195	150	130	75	60.0
10.0	300	900	450	270	190	100	80.0
10.0	370	1110	270	190	160	100	80.0
10.0	520	1560	245	190	160	100	80.0
14.0	370	1110	610	360	260	140	112.0
14.0	460	1380	350	210	165	140	112.0
22.0	500	1500	760	460	330	220	176.0
22.0	620	1860	450	270	230	220	176.0

Reinforcement must be installed as detailed on page 60.



Concrete Compressive Strength $\geq 15\text{N/mm}^2$							
Load Rating	Lift ($\beta/2 \leq 30^\circ$)			Angled Lift ($\beta/2 > 30^\circ$)			
	Mesh Reinforcement	Slot-in links $n \text{ } \varnothing \dots \times L_1$	Edge Reinforcement	Mesh Reinforcement	Slot-in links High Yield $n \text{ } d \dots \times L$	Edge Reinforcement	Angled Lift Reinforcement $\varnothing \times L_{12}$
t	Both sides	mm	mm	Both sides	mm	mm	mm
0.7	A142	2/H6 x 400	H6	A142	4/H6 x 300	H8	H6 x 450
1.4	A142	2/H6 x 400	H6	A142	4/H6 x 400	H8	H6 x 900
2.0	A142	2/H6 x 500	H6	A142	4/H6 x 500	H8	H8 x 950
2.5	A142	2/H8x 600	H8	A142	4/H8 x 600	H10	H8 x1200
3.0	A142	2/H8x 700	H8	A142	4/H8 x 700	H10	H10 x 1150
4.0	A142	2/H8x 800	H8	A142	4/H8 x 800	H12	H10 x 1500
5.0	A142	2/H10 x 800	H10	A142	4/H10 x 800	H12	H12 x 1550
7.5	A193	4/H10 x 800	H10	A193	4/H10 x 800	H12	H14 x 2000
10.0	A193	6/H10 x 1000	H12	A193	4/H10 x 1000	H16	H16 x 2300
14.0	A252	6/H10 x 1000	H16	A252	8/H10 x 1000	H16	H20 x 2600
22.0	A252	8/H10 x 1200	H16	A252	8/H10 x 1200	H16	H32 x 3000

(A) Lifting without angle lift reinforcement

only allowed when:

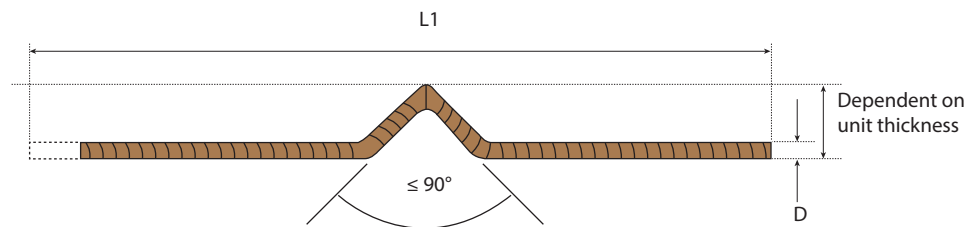
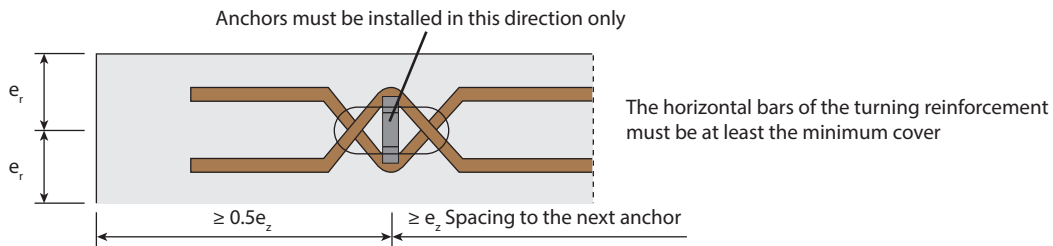
Concrete Strength $\geq 15\text{N/mm}^2 + 3$ times min. thickness of unit

Concrete Strength $\geq 25\text{N/mm}^2 + 2.5$ times min. thickness of unit

Concrete Strength $\geq 35\text{N/mm}^2 + 2$ times min. thickness of unit

(min thickness of unit = $2 \times e$)

Load capacity and installation dimensions for turning and erecting precast units



Reinforcement Steel High Yield L1 = overall length, radius according to BS 8666

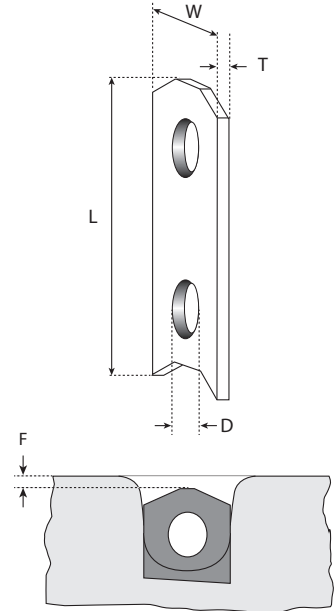
Load Rating (t)	Min. Distances From Edge / Centres for $f_{ck} \geq 15 \text{ N/mm}^2$				Maximum Permissible Load		
	e_r mm	e_z mm	D mm	L1 mm	Axial Lift kN	Angle Lift kN	Erection kN
0.7	100	700	H8	600	7	5.6	3.5
1.4	100	700	H10	700	1.4	11.2	7
2.0	100	800	H10	750	20	16	10
2.5	100	875	H12	800	25	20	12.5
3.0	150	950	H12	850	30	24	15
4.0	150	1050	H14	950	40	32	20
5.0	150	1435	H16	1000	50	40	25
7.5	250	1470	H20	1200	75	60	37.5
10.0	300	1820	H20	1500	100	80	50
14.0	525	1800	H25	1800	140	112	70
22.0	710	2200	H28	1800	220	176	110

Notes: L1 is the unbent length and the minimum amount of reinforcement in the unit should be per page 60.

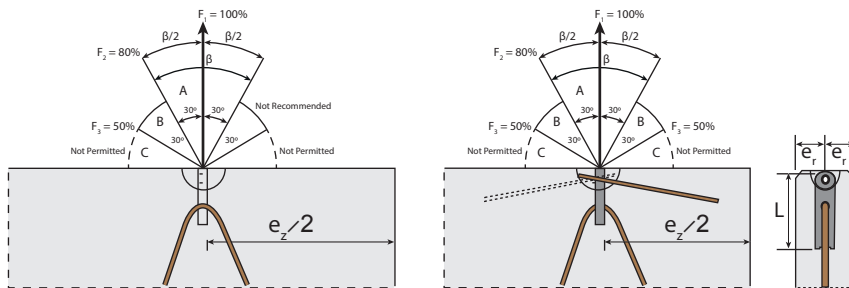
INSTALLATION INSTRUCTIONS FOR RFA-TECH ERECTION AND UNILATERAL ERECTION ANCHORS

Anchor Specifications

Part Code	Load Rating t	Anchor Length L mm	Anchor Width W mm	Anchor Thickness T mm	Hole Diameter D mm	Recess to Anchor Head F mm
TA1.490	1.4	90	30	6	14	10
TA2.090	2.0	90	30	8	14	10
TA2.590	2.5	90	30	10	14	10
TA3.0120	3.0	120	40	10	18	10
TA4.0120	4.0	120	40	12	18	10
TA5.0120	5.0	120	40	15	18	10
TA7.5160	7.5	160	60	16	26	15
TA10170	10.0	170	60	20	30	15
TA14240	14.0	240	80	20	35	15
TA22300	22.0	300	80	28	35	15
TA26300	26.0	300	120	30	65	15



Load capacities and installation dimensions



Position the angled lift reinforcement as closely to the recess former as possible

(A) Lifting without angle lift reinforcement only allowed when:

$f_{ck} \geq 15\text{N/mm}^2 + 3$ times min. thickness of unit
 $f_{ck} \geq 25\text{N/mm}^2 + 2.5$ times min. thickness of unit
 $f_{ck} \geq 35\text{N/mm}^2 + 2$ times min. thickness of unit
 (min thickness of unit $e = 2 \times e_1$)

(B) Where concrete strength $\geq 25\text{N/mm}^2$ F_2 can be taken as 100%

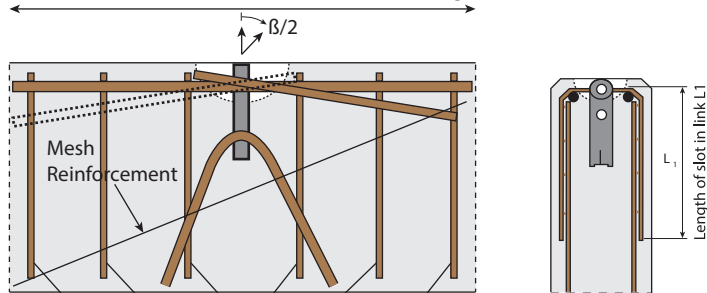
(C) Angle of $\beta/2 \geq 120^\circ$ due to cable spread is not permitted.

Concrete Compressive Strength $\geq 15\text{ N/mm}^2$					
Load Rating t	Anchor Length L mm	Spacing Between Anchor Centres e_z mm	Min. Thickness of Precast Unit $2 \times e_1$ mm	100% F1 Lift $\beta/2 \leq 30^\circ$ kN	80% F2 Angled Lift $\beta/2 > 30^\circ$ kN
1.4	90	500	80	14	11
2.0	90	600	90	20	16
2.5	90	600	100	25	20
3.0	120	650	100	30	24
4.0	120	700	110	40	32
5.0	120	750	120	50	40
7.5	160	1200	130	75	60
10.0	165	1200	140	100	80
14.0	240	1500	160	140	112
22.0	300	1500	180	220	176
26.0	300	1500	200	260	208

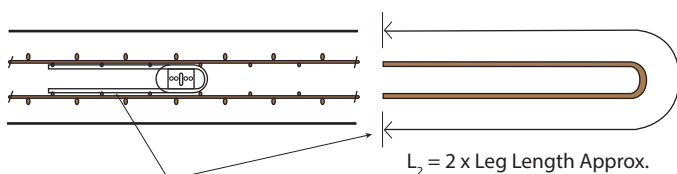
Special sizes and hole positions are available to order.

Reinforcement Required

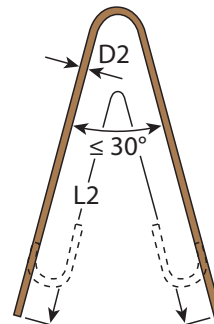
Area of slot-in links should be ≥ 3 times anchor length



Slot-in links positioned as close to the anchor as possible



Angled Lift Reinforcement as close as possible to recess former



(1) Lifting without angle lift reinforcement only allowed when:

Concrete Strength $\ge 15\text{N/mm}^2$ and 3.0 times min. thickness of unit

Concrete Strength $\ge 25\text{N/mm}^2$ and 2.5 times min. thickness of unit

Concrete Strength $\ge 35\text{N/mm}^2$ and 2 times min. thickness of unit

(min thickness of unit = $2 \times e_p$)

(2) L_2 can be reduced in length for increased concrete strength as follows:

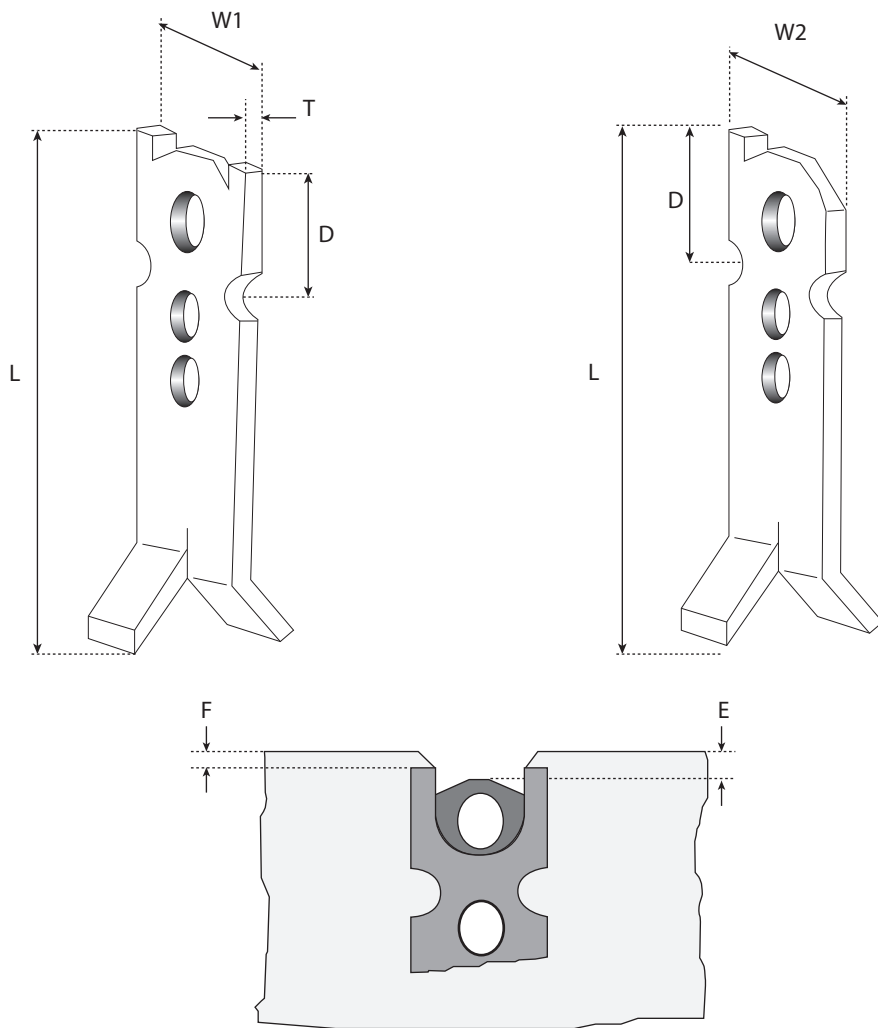
1. Concrete Strength $\ge 25\text{N/mm}^2 = L_2 \times 0.8$
2. Concrete Strength $\ge 35\text{N/mm}^2 = L_2 \times 0.65$

Concrete Compressive Strength $\ge 15 \text{ N/mm}^2$									
Load Rating	Axial Lift ($\beta/2 \le 30^\circ$)				Angled Lift ($\beta/2 > 30^\circ$)				
	Mesh Reinforcement Both Sides of the Anchor	Slot-in links No. / $\varnothing \times L_1$	Edge Reinforcement	Reinforcement Tails No. / $\varnothing \times D2$ (2)	Mesh Reinforcement Both Sides of the Anchor	Slot-in links No. / $\varnothing \times L_1$	Edge Reinforcement	(2) Reinforcement tails No. / $\varnothing \times D2$	(1) Angled Lift Reinforcement No. / $\varnothing \times L_2$
t		mm	mm	mm		mm	mm	mm	mm
1.4	A142	2/H6 x 400	H6	1/H10 x 650	A142	4/H6 x 400	H8	1/H10 x 650	H6 x 900
2.0	A142	2/H6 x 500	H6	1/H12 x 800	A142	4/H6 x 500	H8	1/H10 x 800	H8 x 950
2.5	A142	2/H8 x 600	H6	1/H12 x 1000	A142	4/H8 x 600	H10	1/H12 x 1000	H8 x 1200
3.0	A142	2/H8 x 700	H8	1/H16 x 1000	A142	4/H8 x 700	H10	1/H16 x 1000	H10 x 1150
4.0	A142	2/H8 x 700	H8	1/H16 x 1200	A142	4/H8 x 800	H12	1/H16 x 1200	H10 x 1500
5.0	A142	2/H8 x 800	H8	1/H16 x 1500	A142	4/H10 x 800	H12	1/H16 x 1500	H12 x 1550
7.5	A142	2/H10 x 800	H10	1/H20 x 1750	A142	4/H10 x 800	H12	1/H20 x 1750	H16 x 2000
10.0	A142	4/H10 x 800	H12	1/H25 x 1850	A142	4/H10 x 1000	H16	1/H25 x 1850	H16 x 2300
14.0	A142	4/H10 x 1000	H16	1/H28 x 2350	A142	8/H10 x 1000	H16	1/H28 x 2350	H20 x 2600
22.0	A142	4/H12 x 1200	H16	1/H28 x 3000	A142	8/H10 x 1200	H16	1/H28 x 3000	H25 x 3000
26.0	A142	6/H12 x 1200	H16	2/H28 x 3050	A142	8/H12 x 1200	H16	2/H28 x 3050	H28 x 3450

RFA-TECH ERECTION ANCHORS

Anchor Specifications

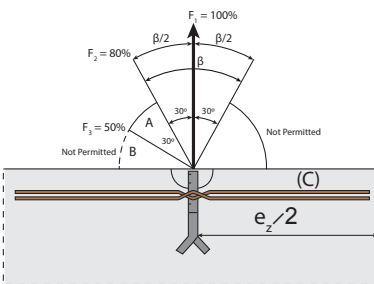
Part Code	Load Rating t	Anchor Length (A) mm	Erection Anchor Width W1 mm	Unilateral Erection Anchor Width W2 mm	Anchor Thickness T mm	D mm	Cover to Anchor Head E mm	Cover to Pitching Nib F mm
TU14200	1.4	200	55	40	6	45	10	5
TU25230	2.5	230	55	40	10	45	10	5
TU04270	4.0	270	70	55	12	70	10	5
TU50290	5.0	290	70	55	15	70	10	5
TU75320	7.5	320	95	80	15	90	15	6
TU10390	10.0	390	95	80	20	90	15	6
TU12550	12.5	500	148	115	20	90	15	9
TU17500	17.0	500	148	115	25	90	15	9
TU22500	22.0	500	148	115	30	90	15	9



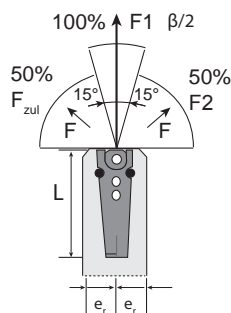
INSTALLATION INSTRUCTIONS FOR RFA-TECH ERECTION AND UNILATERAL ERECTION ANCHORS

Load Capacities and Installation Dimensions

Lifting with Erection Anchors



Pitching with Erection Anchors



Concrete strength $\geq 15 \text{ N/mm}^2$

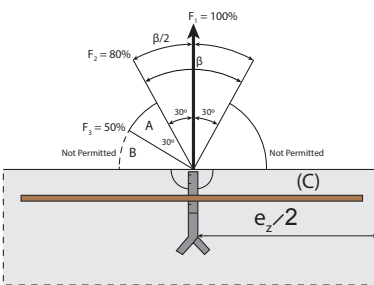
(A) Where concrete strength $\geq 25 \text{ N/mm}^2$ F_2 can be taken as 100%

(B) Angle of lift $\beta/2 > 60^\circ$ due to chain spread angles are not permitted

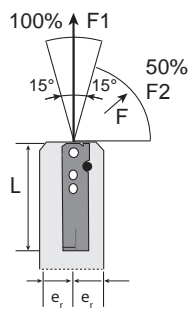
(C) Insert the pitching reinforcement in the anchor notches.

Only Erection Anchors allow pitching on both sides. Reinforcement patterns for pitching are the same for both standard and Unilateral Erection Anchors.

Lifting with Unilateral Erection Anchors



Pitching with Unilateral Erection Anchors



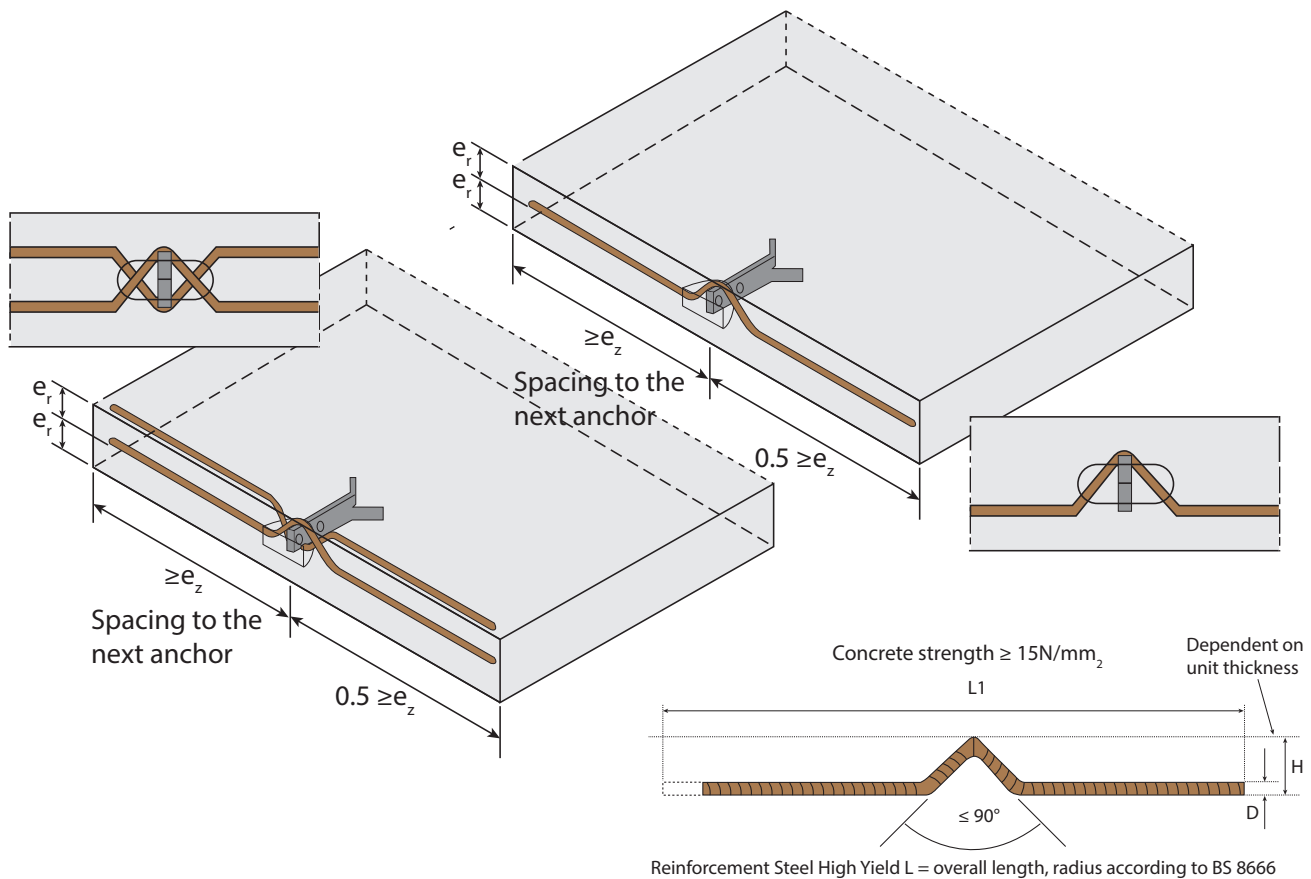
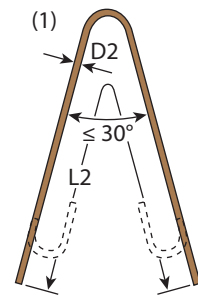
Load Rating t	Anchor Length L mm	Min. Spacing Between Anchor Centres e_z mm	Min. Thickness of Precast Unit ($2 \times e_z$) Without Additional Reinforcement		Min. Thickness of Precast Unit ($2 \times e_z$) With Additional Reinforcement		Axial Lift $(\beta/2 \leq 15^\circ)$	Angled Lift $(\beta/2 > 15^\circ)$	Erection
			Erection Anchor mm	Unilateral Erection Anchor mm	Erection Anchor mm	Unilateral Erection Anchor mm	100% F1 kN	80% F2 kN	50% F1 kN
1.4	200	700	90	100	90	100	14	11	7
2.5	230	800	120	120	120	120	25	20	13
4.0	270	950	140	150	150	150	40	32	20
5.0	290	1000	140	160	180	180	50	40	25
7.5	320	1200	160	175	200	200	75	60	38
10.0	390	1500	200	200	250	250	100	80	50
12.5	500	1500	240	240	320	320	125	100	62
17.0	500	1500	300	300	380	380	170	136	85
22.0	500	1500	360	360	450	450	220	176	110

Pitching reinforcement on both sides also acts as angled lift reinforcement. No further angled lift reinforcement is required. The horizontal legs of the turning reinforcement should be situated within the outermost position of the reinforced area.

For the following compressive concrete strengths, the length of L2 can be reduced by the following factors:

- (A) Concrete Compressive Strength $\geq 25 \text{ N/mm}^2 = \times 0.8$
- (B) Concrete Compressive Strength $\geq 35 \text{ N/mm}^2 = \times 0.65$

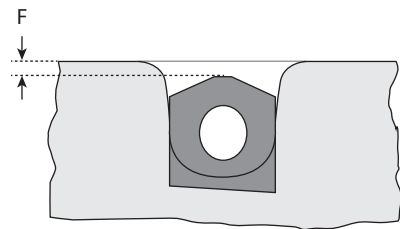
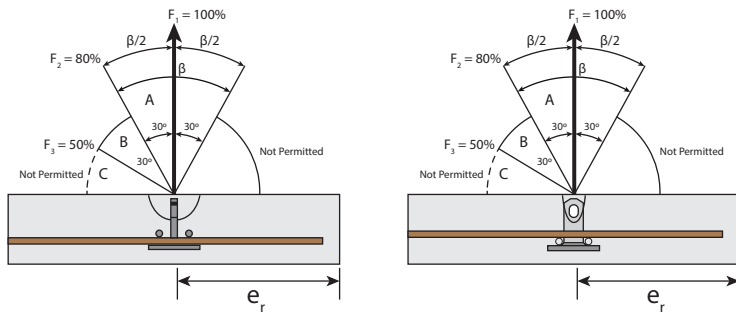
Reinforcement of thin walled concrete precast unit		Concrete Compressive Strength $\geq 15 \text{ N/mm}^2$
Load Rating t	Tilting reinforcement $D \times L1$ mm	Additional reinforcement for lift $L2 \times D2$ mm
1.4	H10 x 700	H10 x 650
2.5	H12 x 800	H12 x 1000
4.0	H16 x 950	H16 x 1200
5.0	H16 x 1000	H16 x 1500
7.5	H20 x 1200	H20 x 1750
10.0	H20 x 1500	H20 x 1900
12.5	H25 x 1500	H25 x 2200
17.0	H25 x 1800	H28 x 2500
22.0	H25 x 1800	H28 x 3000



INSTALLATION INSTRUCTIONS FOR RFA-TECH PLATE ANCHORS

Load Capacities, Installation Dimensions and Additional Reinforcement for Thin Slabs

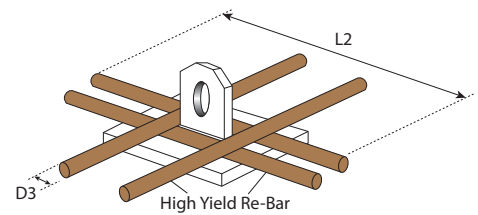
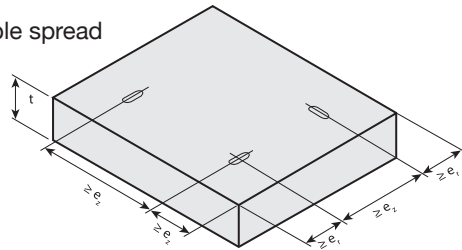
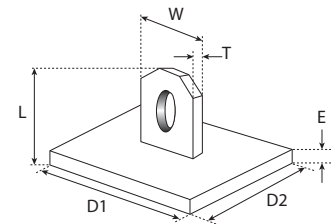
Part Code Black	Part Code Galv	Load Rating t	Anchor Height L mm	Anchor Width W mm	Anchor Thickness T mm	Plate Size D1 x D2 mm	Plate Thickness E mm	Recess to Anchor Head F mm
PA1.455	PA1.455G	1.4	55	30	6	80 x 80	8	10
PA2.580	PA2.580G	2.5	80	30	10	80 x 80	8	10
PA50120	PA50120G	5.0	120	40	15	100 x 100	10	10
PA10160	PA10160G	10.0	160	60	20	140 x 140	12	15



- (A) Angled Lift at $\beta/2 \geq 30^\circ$ and $\beta/2 \leq 60^\circ$ without angled lift reinforcement only permissible when:
 Concrete Strength $\geq 15 \text{ N/mm}^2$ + 3-fold min. thickness of unit
 Concrete Strength $\geq 25 \text{ N/mm}^2$ + 2.5-fold min. thickness of unit
 Concrete Strength $\geq 35 \text{ N/mm}^2$ + 2-fold min. thickness of unit

- (B) Where concrete strength $\geq 25 \text{ N/mm}^2$ F2 can be taken as 100%.

- (C) Angle of $\beta/2 > 60^\circ$ due to cable spread are not permitted.



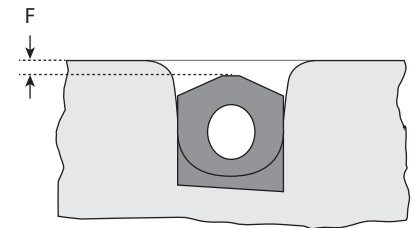
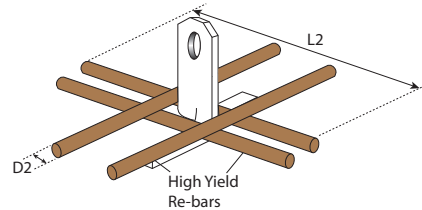
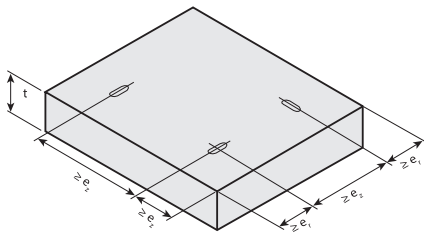
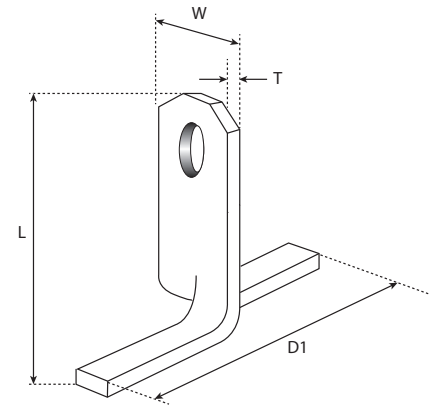
Concrete Compressive Strength $\geq 15 \text{ N/mm}^2$							
Load Rating t	Anchor Length	Min. Spaces Between Centres and from Edges		Reinforcement Tails		Permissible Load	
	L	e_r	e_z	D3	L2	Axial Lift $\beta/2 \leq 30^\circ$ 100% F1	Angled Lift $\beta/2 \leq 30^\circ$ 80% F2
	mm	mm	mm	mm	mm	kN	t
1.4	55	115	230	H8	200	14	11.2
2.5	80	165	330	H10	300	25	20
5.0	120	240	480	H12	450	50	40
10.0	160	330	660	H16	600	100	80

INSTALLATION INSTRUCTIONS FOR RFA-TECH FLAT FOOT ANCHORS

Load Capacities, Installation Dimensions and Additional Reinforcement for Thin Slabs

The Flat Foot Anchor is an alternative to the Flat Plate Anchor. Please refer to page 66 for lifting angle reduction factors and lifting is only permitted at a concrete strength of $\geq 20\text{N/mm}^2$.

Part Code Black	Load Rating t	Anchor Height L mm	Anchor Width W mm	Anchor Thickness T mm	Foot Width D1 mm	Recess to Anchor Head F mm
FA0760	0.7	65	30	5	70	10
FA1465	1.4	65	30	6	70	10
FA2070	2.0	70	30	8	80	10
FA2575	2.5	75	30	10	94	10
FA3090	3.0	90	40	10	100	10
FA40110	4.0	110	40	12	100	10
FA50125	5.0	125	40	15	105	10
FA75170	7.5	170	60	16	120	15
FA10200	10.0	200	60	20	120	15
FA12522	12.5	220	80	16	200	15
FA17270	17.0	270	80	20	200	15
FA22310	22.0	310	90	28	200	15



When lifting towards the edge of a unit, install angled lifting reinforcement as per Two Hole Anchors.

Reinforcement Required

Additional reinforcement should be placed on the foot and in contact with the anchor.

Load Rating t	Anchor Length L mm	Minimum Thickness of Unit t mm	Min. Distances Between Centres and Edges		Reinforcement Tails		Permissible Loads		
			e_1 mm	e_2 mm	D2 mm	L2 mm	$\geq 15 \text{ N/mm}^2$ kN	$\geq 25 \text{ N/mm}^2$ kN	$\geq 30 \text{ N/mm}^2$ kN
0.7	65	95	140	280	8	200	7.0	7.0	7.0
1.4	65	95	140	280	8	250	14.0	14.0	14.0
2.0	70	100	150	300	8	300	18.0	20.0	20.0
2.5	75	105	160	320	8	300	20.0	25.0	25.0
3.0	90	120	190	380	10	400	28.0	30.0	30.0
4.0	110	140	230	460	12	450	37.0	40.0	40.0
5.0	125	160	260	520	12	500	44.0	50.0	50.0
7.5	170	215	340	680	14	600	54.6	70.4	75.0
10.0	200	245	400	800	14	600	75.5	100.0	100.0
12.5	220	265	440	880	16	750	88.5	125.0	125.0
17.0	270	315	540	1080	16	900	120.3	170.0	170.0
22.0	310	355	620	1240	20	1100	148.0	220.0	220.0

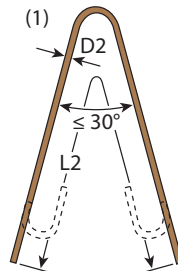
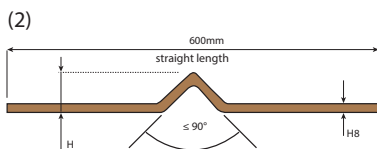
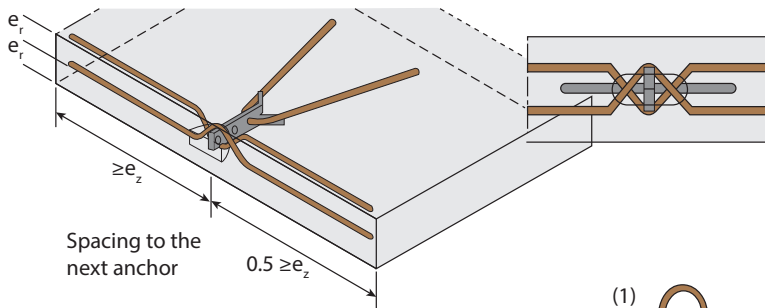
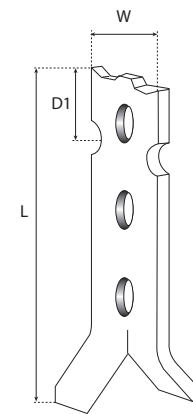
INSTALLATION INSTRUCTIONS FOR RFA-TECH UNIVERSAL ANCHORS

Load Capacities, Installation Dimensions and Additional Reinforcement

The Universal Anchor has been designed especially for lifting and turning thin panels and lightweight concrete units.

Anchor Specifications

Part Code Block	Load Rating t	Anchor Length L mm	Anchor Width W mm	Cover to Pitching Re-Bar D1 mm
UA125120	1.25	120	30	25



Recommended reinforcement

An additional reinforcement tail as in (1) is essential for distributing the loads in very thin panels or where only a single layer of mesh is installed in the unit. For turning and tilting, a turning reinforcement as shown in (2) must be incorporated.

D2 = H8
L2 = 700mm

The value of H depends on the unit thickness and the bend radius must be to BS8666.

Permitted loads of Universal Anchor

Part Code	Minimum spacing between centres	Thickness of element	Axial Lift up to $\beta/2 \leq 30^\circ$			Angle Lift up to $\beta/2 = 45^\circ$			Tilting and turning		
			Permitted load at concrete strength			Permitted load at concrete strength			Permitted load at concrete strength		
			15N/mm ² kN	25N/mm ² kN	35N/mm ² kN	15N/mm ² kN	25N/mm ² kN	35N/mm ² kN	15N/mm ² kN	25N/mm ² kN	35N/mm ² kN
UA125120	240	60	10.0 (3)	12.5 (3)	12.5 (3)	10.0 (3)	12.5 (3)	12.5 (3)	-	-	-
		80	12.5 (3)	12.5 (3)	12.5 (3)	10.0 (3)	12.5 (3)	12.5 (3)	4.1	4.6	5.0
		100	12.5 (3)	12.5	12.5	10.0 (3)	12.5	12.5	4.5	5.2	5.6
		120	12.5	12.5	12.5	12.5	12.5	12.5	4.8	5.6	6.0
		140	12.5	12.5	12.5	12.5	12.5	12.5	6.0	6.25	6.25
		160	12.5	12.5	12.5	12.5	12.5	12.5	6.25	6.25	6.25

(3) with additional reinforcement dia. H8 x 700mm

RFA-TECH RING CLUTCHES

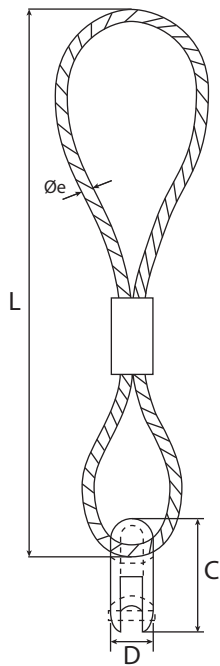
Identification and Markings

Each Ring Clutch is proof loaded to twice safe working load and undergoes a thorough inspection before being supplied, certified and index numbered for traceability when supplied new. Each Ring Clutch is also stamped with the CE mark and a date of manufacture stamp in the form month and year, e.g. March 2013 would be 0313.

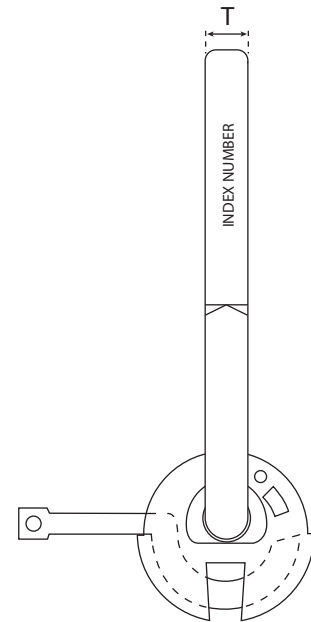
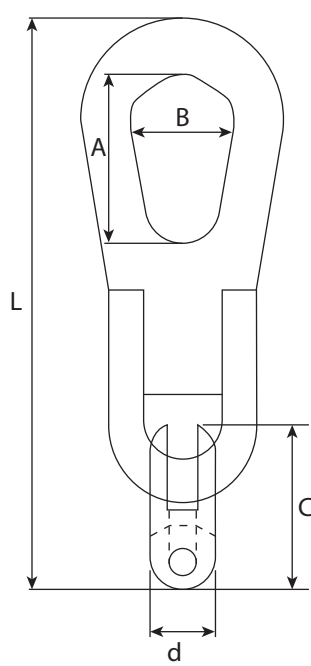
All health and safety regulations must be observed for the country of use and suitable risk assessments should be undertaken when using Ring Clutches with site lifting equipment such as cranes or other similar lifting apparatus.

Part Code	Load Group t	A mm	B mm	C mm	D mm	T mm	L mm
TF1LC125	1.25	-	-	52	20	-	370
TF2LC025	2.5	76	54	79	28	14	265
TF2LC05T	5	92	62	104	38.5	20	331
TF2LC10T	10	120	85	148	50	26	435
TF2LC26T	26	160	120	206	72	32	605

1.25t Wire Rope Ring Clutch



2.5t – 26.0t Ring Clutch



Ring Clutches

Ring Clutches are a manually operated coupler available in various load groups for use with Spread Anchors. The head of the clutch includes a locking pin which fastens around the lifting hole of the anchor when installed in the recess of the concrete unit. The Ring Clutch is coupled to a corresponding Spread Anchor for the safe axial or angled lifting, turning or swivelling of precast concrete units. All products are rigorously tested, inspected and are supplied with Declarations of Conformity with each order. Ring Clutches are available in 2.5t, 5.0t, 10.0t and 26.0t load groups with both solid handles and rope attachments.

Each Ring Clutch is marked with the safe working load, the RFA-Tech identification mark, the load rating of the clutch, the individual index number and CE Mark.

Instructions for Use

To lift the precast unit, first select the correct load rated clutch, this can be found stamped on the head and the shackle. Only the correct Ring Clutch will fit the anchor preventing mismatching of load groups. Place the clutch over the anchor with the pin retracted as shown in (1).

Engaging and Lifting

To engage the clutch for lifting, the pin is locked through the anchor by moving the handle away from the direction of lift, as shown in (2). If correctly installed the clutch should be free to move in any direction and the unit can be de-moulded or lifted safely.

The clutch can be used to lift in any direction but angles must not exceed 60° as shown in (2). The anchor's load limit and angle reduction factors must be observed.

Releasing

To release, remove tension from the chains and, with the clutch in hand, pull the locking pin towards the main body as shown in (3). The clutch will now be released.

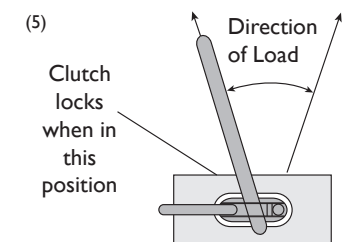
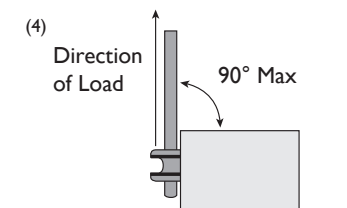
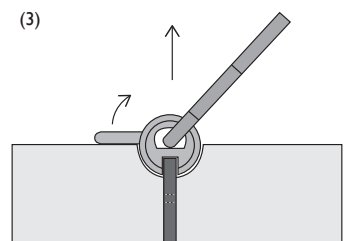
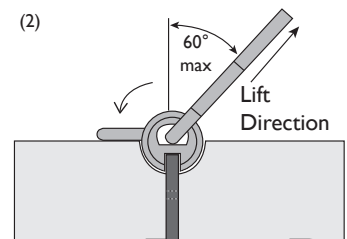
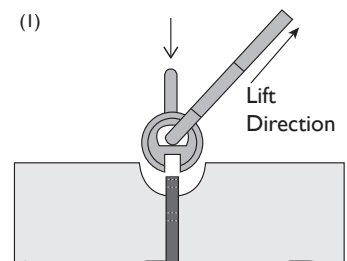
Pitching / Turning Units

When pitching and turning units using Erection Anchors, the direction of the lift with the Ring Clutch should be a maximum of 90° to the panel as shown in (4). The anchor will prevent damaging the unit under load. The use of a spreader beam is highly recommended to prevent torsional and angular forces. If the Ring Clutch is pulled towards the surface of the units at >90° (4) then this risks bending the Ring Clutch on the edge of the unit or causing damage to the anchor and /or the concrete.

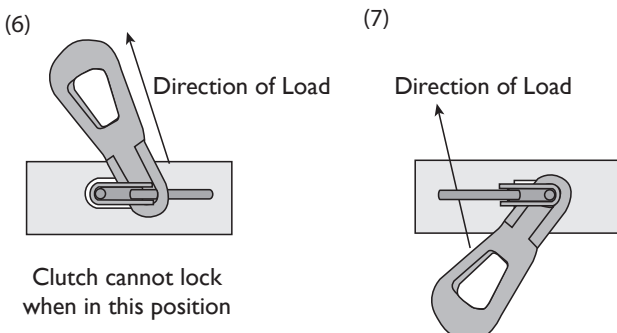
Misusing of Ring Clutches

If the shackle shown below in (6) is used in this position lifting head cannot lock.

Do not use the Ring Clutch as shown in (7) as the clutch locks in this position and can cause damage to the clutch, anchor, unit or a combination thereof. The clutch can also safely be used to pitch as in (5).



Not Permitted

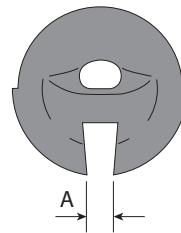


Ring Clutches - Maintenance and Examination

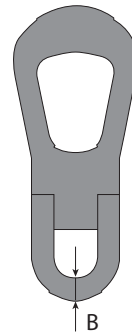
In line with LOLER lifting regulations, all Ring Clutches should be examined by a qualified engineer every six months from the date of the original test which is supplied when new. Providing they are treated with care, Ring Clutches can be re-used over a number of years. However, before every lift, it is essential that each clutch be checked for damage and wear. RFA-Tech do not authorise or guarantee the safety of any item that has had any repair other than the replacement of worn locking pins. As the clutch head generally has a much longer life than the pressed cable loops, RFA-Tech can fit clutch heads onto new cables when required.

Lifting Head

As part of the pre-lift checking procedure the Ring Clutch head should be examined for any wear or damage and should no longer be used if any is present. The aperture (A) should not be greater than the values stated in the table opposite.



Load Group t	Nominal Dimension A mm	Maximum Dimensions A mm
1.25	7	8
2.5	12	13
5.0	18	19.5
10.0	22	23.5
26.0	34	37



Load Group t	Nominal Dimension B mm	Minimum Dimensions B mm
2.5	14	13
5.0	20	19
10.0	28	27
26.0	40	38.5

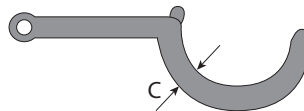
Shackles

If there is any damage to the shackle such as bending, etc., then it should no longer be used. If the value of (B) is equal to, or greater than those stated in the table opposite then the Ring Clutch should no longer be used.

Load Group t	Nominal Dimension C mm	Minimum Dimensions C mm
1.25	8	7
2.5	13	12
5.0	16.5	15.5
10.0	23.5	22.5
26.0	32	31

Locking Pins

This is the only part of the Ring Clutch that can be replaced by the user. Spare parts are available from RFA-Tech on request. The (C) dimension should be checked before lifting and replaced if the value is less than stated in the table opposite.



Wire cables should be checked for the following defects:

- Kinking and buckling
- One braid broken
- Slackening of the outermost exposed layer on free lengths
- Crushing on free lengths
- Crushing at the eye's contact point with more than 4 ruptured wires on braided cables, or more than 10 ruptured wires on cablelaid rope
- Corrosion marks
- Damage or severe wear to the cable connector

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

Cable Type	No. of visible ruptured wires over a read length of		
	3 x dia.	6 x dia.	30 x dia.
Braided cable	4	6	16

Wire Cable Loops

Before using a Ring Clutch with a Wire Rope it should be checked for damage such as broken braids, kinking, corrosion, damaged ferrules or slipping of wires within, separated braids or broken wires at any point on the rope. Wire ropes should not be in contact with corrosive substances such as acids or alkalis and should be replaced when any damage is observed. When using, always select a large diameter crane hook as the pressure exerted by smaller hooks can cause premature damage and wear to the wire. RFA-Tech can replace worn wire ropes on request.

RFA-TECH SPREAD ANCHOR ACCESSORIES

Rubber Recess Formers

These are used for mounting anchors to wooden formwork, or floating installation for all variations of Spread Anchors. A smaller version is available for Universal Anchors.

The former has a metric thread and a bayonet fixing to allow the user to install through the side of either wooden or steel formwork with threaded bar. These are made from a hardwearing and flexible rubber and have a plastic insert that surrounds the anchor to help prolong the life of the former. Available in all load groups.

Steel Magnetic Formers

Used for mounting anchors to steel moulds or formwork beds. Special variations are available to order.

Metal Nailing Plates

Used for attaching anchors to wooden formwork.

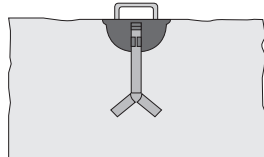
Former Closer

Used for securely closing the former during floating installations.

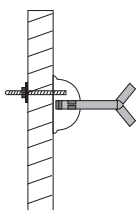
Installing Anchors

When installing anchors, always be sure to use the appropriate former for the formwork being used, and ensure that it is firmly attached to prevent it becoming dislodged when pouring concrete. Always ensure that the former is coated in mould oil to allow easy removal once the concrete is set, and that the possibility of air pockets is eliminated with vibration or an equally effective method. To remove the former use two steel bars in a scissors action as shown below, being careful not to cause any damage and remove any excess concrete prior to lifting. Always ensure formers are in suitable condition before casting and replace when worn out.

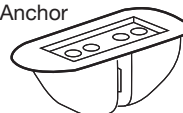
Floating Installation



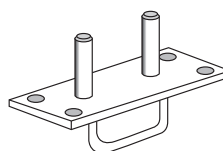
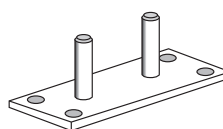
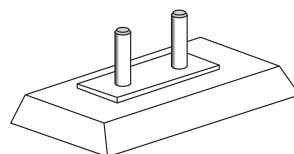
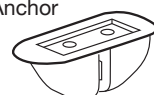
Installation Through Formwork (Wood or Steel)



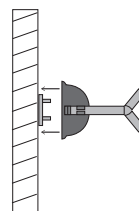
Spread Anchor Former



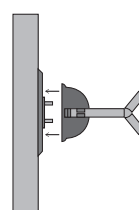
Universal Anchor Former



Installation With Nailing Plate (Wooden Mould)



Installation With Magnetic Holding



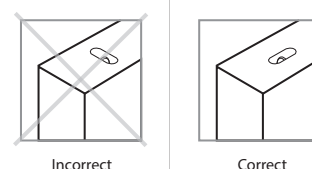
Load Group	Part Code
1.25t	RRF125
2.5t	RRF025
5.0t	RRF050
10.0t	RRF100
26.0t	RRF260

Load Group	Part Code
2.5t	SAMF025
5.0t	SAMF050
10.0t	SAMF100

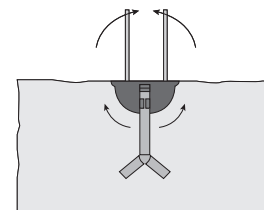
Load Group	Part Code
1.25t	SANP125
2.5t	SANP025
5.0t	SANP050
10.0t	SANP100
26.0t	SANP260

Load Group	Part Code
2.5t	SAFH025
5.0t	SAFH050
10.0t	SAFH100
26.0t	SAFH260

Spread, Erection and Two Hole Anchors may only be installed in thin-walled elements with the flat steel at right-angles to the slab.



Removal of Former Using Steel Bars



NOTES



TERMS AND CONDITIONS

General Terms. All prices are exclusive of VAT.

The current price list replaces all other lists and quotations issued.

A minimum order of £30 prevails.

As logistic costs fluctuate please consult www.rfa-tech.co.uk for current carriage rates and restrictions.

All sales subject to our standard terms and conditions of sale.

1. General

Except to the extent that such provisions of the Sale of Goods Act 1979 are non-excludible these conditions together with such provisions of the said Act are not inconsistent herewith shall apply to all sales by RFA-TECH (the company) and shall form the basis of a contract between the company and the customer. No variation of these conditions shall be effective unless made in writing and signed by a director of the company. Unless otherwise agreed in writing these conditions shall prevail over any other terms and conditions whether in writing or implied by Law or by trade, custom, practice or previous course of dealing and any such inconsistent terms and hereby expressly excluded. This agreement will be governed and construed in accordance with the laws of England and Wales. The parties' hereto submit to the exclusive jurisdiction of the courts of England and Wales.

2. Price

All prices quoted are based on costs ruling at the date of quotation, (excluding VAT). If there are any alterations to these costs the Company reserves the right to alter the prices and will notify the customer in writing thereof, the issuing of a new price list is by the Company shall be deemed to be such notice. Thereafter the customer shall have the right to cancel the order on written notice to that effect being given to the company within seven days of the written notice giving the alteration in price.

3. Payment

(a) In the absence of any concession to the contrary by the Company from time to time accounts are due and payable in full within 30 days of the end of the month in which the invoice was dated (due date) of the respective invoice.

(b) If the customer fails to pay any amount due on the due date:-

(i) The company has the right to cancel any contract made with the customer and/or suspend or continue delivery of goods and materials at the company's option without prejudice to the company's right to recover damages for any loss sustained by it.

(ii) The outstanding sum shall carry interest from the due date at a rate of 4% above Barclays Bank plc base rate from time to time and for the time being in force per month until settlement. A part of a month being treated as a whole month for the purposes of calculating interest.

(iii) The whole balance of the price of this contract and all other contracts invoiced shall immediately become due and payable together with interest.

4. Suitability of Goods

The customer is responsible for the suitability of the goods and materials bought. No warranty is given nor shall any warranty condition be implied that the goods are reasonable fit and suitable in size shape capacity quality or otherwise for the purpose for which they are bought and the Company shall not be under any liability whatsoever due to any goods being unfit or unsuitable.

5. Notification of Loss, Shortages, Damage in Transit

(a) Any damage shortage or pilferage in transit to goods must be notified in writing to the Company within seven days of delivery all damage, shortage or pilferage to goods apparent at the time of delivery must be noted on the carriers delivery note at the time of delivery otherwise the Company cannot consider accepting liability.

(b) Non-delivery of goods must be notified in writing to the Company within seven days of our invoice relating thereto otherwise liability by the Company cannot be considered.

6. Defects

If any goods show defects arising solely from faulty materials and/or workmanship, the Company's liability shall be limited to replacing such goods, but no such liability shall arise unless notification of such defects is received WITHIN SEVEN DAYS from receipt of the goods and the alleged defective goods are returned to the Company. In no circumstances shall the Company be liable for any consequential loss howsoever caused.

7. Sale by Sample and/or Description

Unless the contract specifically provides for a sale by sample and/or description, the submission of a sample and/or the giving of a description shall not be held to indicate the sale is a sale by sample and/or description and any warranty expressed or implied by law to the contrary effect is hereby excluded. Where the contract specifically provides for a sale by sample and/or description regard will be given to normal variations arising from the nature of the materials from which the goods are manufactured. Any variation required at a future date must be subject to further negotiations.

8. Cancellation

Contracts and orders may be cancelled by customers with the sanction of a Director of the Company, which sanction is in the Company's sole discretion and can only be given upon payment of such sum by way of compensation as specified by the Company, and such sum by way of compensation would include payment in respect of loss of profits.

9. Retention of Title

(a) The title to the property in the goods comprised in an order shall not pass to the customer until amounts for all goods comprised in that order and all other outstanding amounts due to us in respect of any other transactions between the parties then outstanding has been paid in full not withstanding that the goods may have been delivered to the customer.

(b) Notwithstanding the above paragraph the goods shall be at risk of the customer from the time of delivery to or collection by the customer and the customer shall take all necessary steps to insure the goods for their full invoice value.

(c) The customer shall separately store the goods and identify the goods as belonging to the Company until the relevant invoice has been settled in full. The customer is prohibited from incorporating the goods or using the same until such settlement.

(d) The customer may sell the goods to a third party in the ordinary course of the customer's business but only under the following conditions:-

(i) Only at such a price that would enable the customer to repay the amount due to the Company under (a) above.

(ii) The customer shall in every case make it a condition that the title in the goods shall not pass to the third party until the third party has paid to the customer the amount in paragraph (d)(i) above.

(iii) Immediately upon such sub-sale the customer shall notify the Company of the name and address of the third party and the Company shall be entitled to inform the third party of our interest in the goods.

(iv) The proceeds of any sub-sale shall be held by the customer on trust for the Company and shall be paid into a separate Bank Account specifically designed as being a trust account for the Company and such time as payment for the goods is made in full to the Company.

(e) Save as above, the customer shall not dispose of the goods in any way or create or allow to be created any rights in the goods in favour of the third party.

(f) Should the customer be in arrears with any payment to the Company, the Company is hereby granted an implied license to enter the customer's premises

where the goods are then being kept or stored in order to re-possess the goods and the cost of any such re-possession shall be borne by the customer. The Company shall not be responsible for any damage howsoever caused arising out of the re-possession of the goods under this clause.

10. Limitation of Liability

In all cases the Company's liability in any claim is limited to the amount covered by the Company's insurance. The Company cannot accept liability for any loss or damage caused to the customer by reason of the Company's products being found to involve the infringement of any third party's patent or patents.

11. Termination

The Company reserves the right to terminate the order upon giving reason able written notice to the customer. The Company further reserves the right to terminate this order if sums due and payable by the customer under previous orders remains outstanding.

12. Insolvency

This clause applied if :-

12.1.1 The customer makes any voluntary arrangement with the creditors or becomes subject to an administration order (being an individual or firm) becomes bankrupt or (being a Company) goes into liquidation otherwise than for the purposes of amalgamation or reconstruction or

12.1.2 An encumbrancer takes possession or a receiver is appointed of any of the property or assets of the Customer or

12.1.3 The customer ceases or threatens to cease to carry on business or

12.1.4 The Company reasonably apprehends that any of the events mentioned above is about to occur in relation to the customer

12.2 If 12.1 above applies then without prejudice to any other rights of the Company.

12.2.1 The Company shall be entitled to cancel the contract and

12.2.2 Any payment due but not paid (not withstanding that the due date may not have arisen) shall become immediately due and payable not withstanding any previous agreement or arrangement to the contrary together with interest at the rate specified in 3(b) above

13. Delivery

13.1 The Company shall make all reasonable efforts to meet quoted delivery dates, although such dates and times are not guaranteed.

13.2 The Company shall not be liable for any delay in delivery due to factors beyond the Company's control, which shall include without prejudice to generality of the foregoing. Acts of God, explosion, flood, tempest, fire, accident, war or threat of war, sabotage insurrection civil disturbance or measures of any kind on the part of any Government or Parliamentary Authority. Strikes lock out or any other industrial actions or trade disputes (whether involving the Company's employees or third parties) power failure, shortage of fuels or materials or breakdown in machinery. The Company shall endeavour to fulfil its obligations as soon as is reasonably practicable taking into account the relevant aforementioned event.

14. Returned Goods

Goods may be returned by the customer with the prior agreement of the Company, but will be subject to a 25% rehandling charge, or a minimum charge of £20 (GBP), whichever is the greater.



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