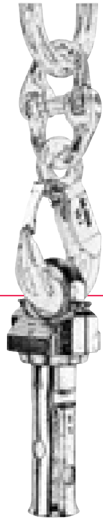
SAFELIFT



User manual

2005

B.S.Italia®
Styl-Comp Group
innovazione basata sull'esperienza
innovation based on experience

PLEASE READ ALL THE INFORMATION AND INSTRUCTIONS IN THIS MANUAL CAREFULLY BEFORE USING ANY COMPONENT IN THE ECO SYSTEM, COVERED BY INTERNATIONAL PATENT.

If you have any queries about the correct use of the components described in this manual, please contact B.S.Italia:

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B.S.Italia is ISO 9001 certified and the SAFELIFT system is designed and built in accordance with:

B.S.Italia certification

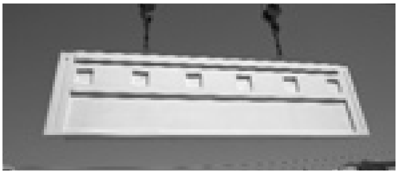
Product certification

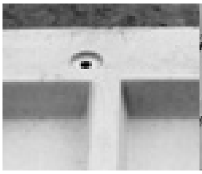
- European machine directive:
  89/392/EEC;
  91/368/EEC;
  93/44/EEC.
- Health and safety at work rules
  In Italy:
  Legislative Decree 626;
  Legislative Decree 494 and amendments.
- Berufsgenossenschaft (Germany) rules for safe anchorage during shipping and anchorage systems (Sicherrheitsregeln für Transportanker und - systeme von Betonfertigteilen ZH 1/17).
- Adhesion:
  Norwegian technical specifications;
  Direct research and technical literature.
- Dynamics:
  Italian ministerial decree 1987;
  DIN 15018.
- General parts:
  Eurocodes and state-of-the-art.
- Product standards:
  ISO, EN, DIN and UNI standards.
- Material controls and accredited labs:
  SINAL - SINAL is part of EA (European Accreditation).
- Quality System:
  ISO 9001 through IGQ: IGQ is part of CISQ, which in turn is part of IQNet Reg. Nr. IT-0188.

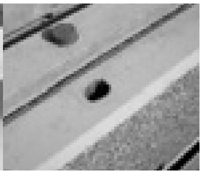
Table of Contents

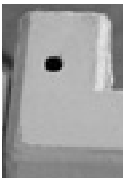
All drawings in this Manual are purely indicative.

Architectural panels, cladding and small elements









Fast, safe and foolproof

SAFELIFT's fast, easy hooking-up is totally foolproof: lifting cannot start until the shackle and the SAFELIFT have been safely and fully engaged.

Universal: all types of movement for any element, different loads with the same equipment

The SAFELIFT system lets you move architectural panels (horizontal or vertical) at will, regardless of their thickness, and columns, beams, roofing systems (ridge tiles, andirons and double Ts) and concrete pipes.

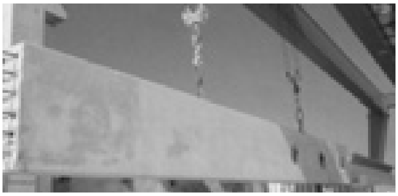
Light and cost-effective

The system lets you save on production costs thanks to the low cost and less concrete needed to patch the gaps.

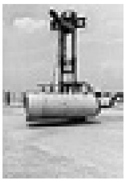
Less space needed

More concrete around the insert without the need for cavities on the outside means less local weakness and the best aesthetic solution.

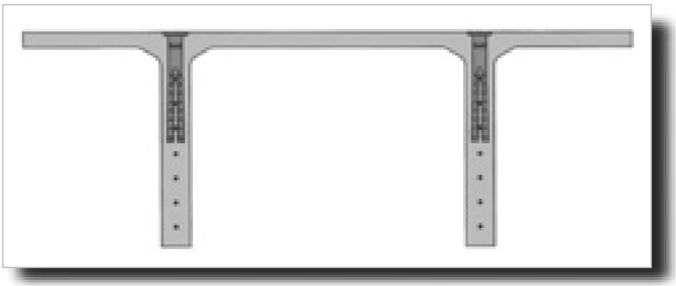
Structural elements



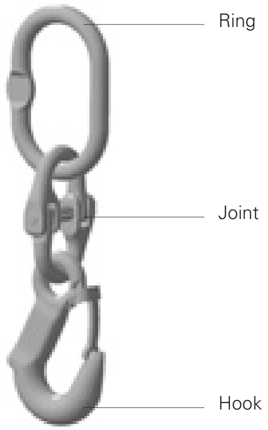
Concrete pipes



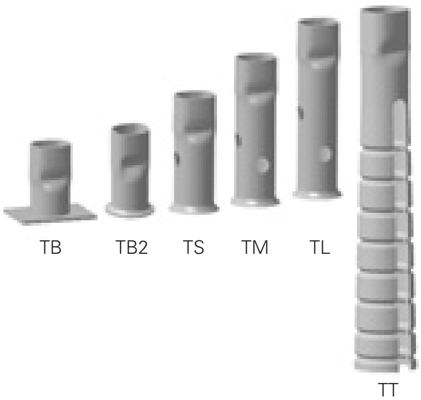
Double T



Articulated hook



Shackle



The SAFELIFT lifting system is a device for safe rapid handling of precast reinforced concrete elements, such as walls, panels, columns, beams, stairs, pipes or boxes.

Articulated hook

This is the device placed between the load bearing shackle and the crane hook or the crane/cable system. It consists of three parts, the central one being a double "C" compression link, allowing for all types of movement and guaranteeing absorption of strain.

Shackle

This permanent device is inserted and fixed to the SAFELIFT for safe movement of the precast element thanks to the articulated hook.

Tube

This permanent device is embedded in the precast concrete element (suitably tied and confined) and lets you lift loads of between 1 and 12 tons. It comes in the following versions:

TS Standard

Used mainly for vertical lift of beams and general structures. Can be used for edge lifting, but only if ties are applied.

TM Medium

Used for elements requiring tension and shear, such as panels.

TL Long

Thanks to its greater depth and longer lifting arm, it offers better safety and prevents cracking. Suitable for fresh concrete and special elements, such as architectural panels.

TB Base

Designed for thin elements with flat stripping.

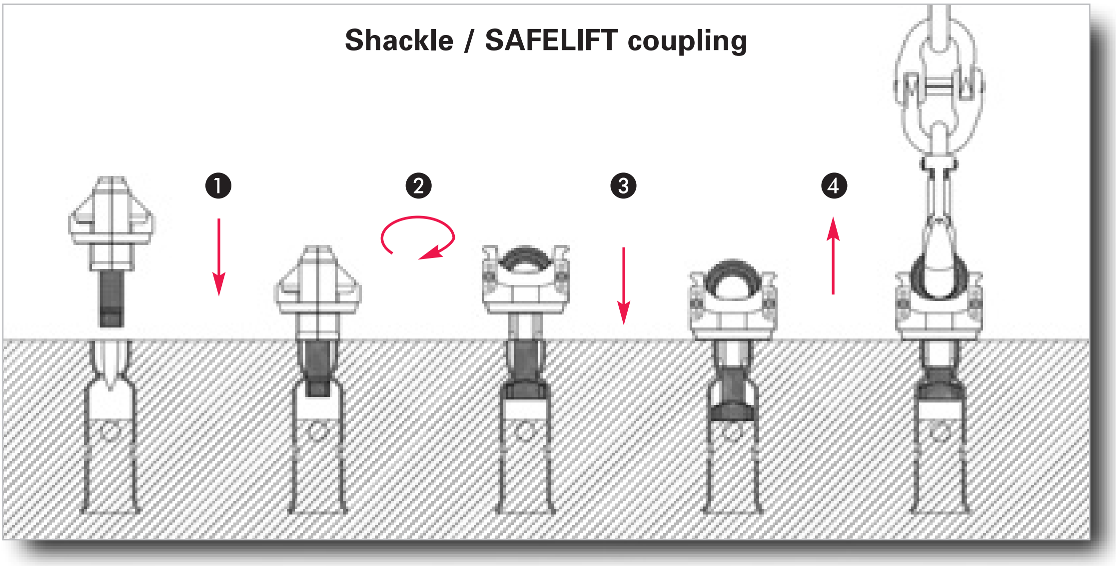
TB2

Designed for flat stripping without the need for extra ties.

TT Pre-tied

Designed for double T elements with vertical lifting, no need for strain ties: it's pre-tied.

SAFETY SYSTEM



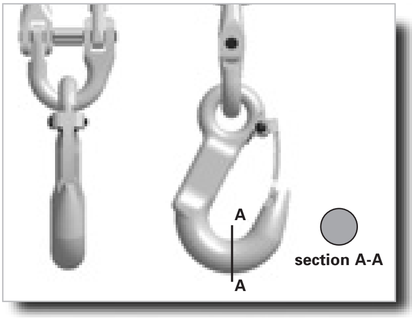
❶ Insert the shaft of the shackle into the tube

❷ Rotate the shackle by 90°

❸ Insert the neck of the shaft into the SAFELIFT

❹ Extract the ring and attach the hook

The safety system is based on the shackle ring being visible and so ready to be hooked up only once the shackle and the SAFELIFT have been safely engaged. The system is therefore foolproof.



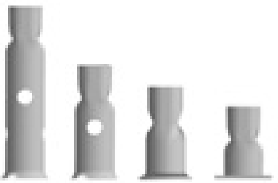
The safety of the coupling is also guaranteed by the insertion of the hook in the ring in the shaft. The special cross-section of the hook guarantees perfect coupling of the shaft / SAFELIFT and thus maximised distribution of the strain within the system regardless of the angle of the hook.

B.S.Italia does NOT, therefore, authorise or accept the use of other hooks that lessen the safety of the system or may cause abnormal loads and consequent buckling.

Hook and shackle	Safelift	Accessories

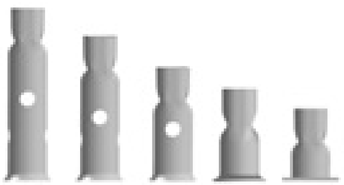
1,5 ton

→ **1-1,5 tons**



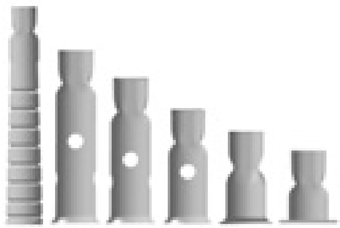
3 ton

→ **3 ton**

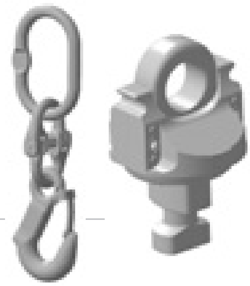


6 ton

→ **4-5-6 ton**



12 ton



→ **8-10-12 ton**

Accessories

Shear tying

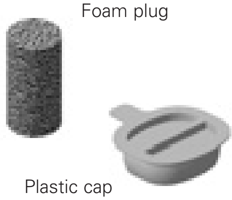
Shear tie

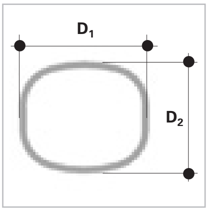
Fixing sets

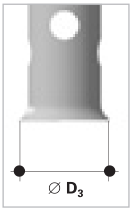
With spacer for
wood/steel forms

With magnetic spacer
for steel forms

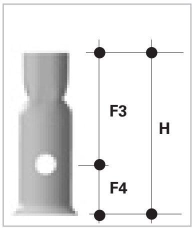
Plugs



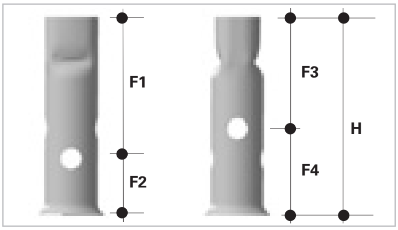




TS



TM-TL



SECTIONS

Loads (tons)	1	1,5	3	4	5	6	8	10	12
D_1	25	26	48,3	55	57	57	70	70	78
D_2	22	23	37,6	48	50	50	60	60	71
Ø D_3	31	35	62	72	74	74	93	93	97

TS - standard SAFELIFT

Loads (tons)	1	1,5	3	4	5	6	8	10	12
H	80	80	130	165	165	165	190	220	220
F3	60	60	89	118	118	118	141	141	141
F4	20	20	41	47	47	47	49	79	79

TM - medium SAFELIFT

Loads (tons)	1	1,5	3	4	5	6	8	10	12
H			165	210	210	210	240	270	270
F1			119	150	150	150	175	190	190
F2			46	60	60	60	65	80	80
F3			95	123	123	123	145	145	145
F4			70	87	87	87	95	125	125

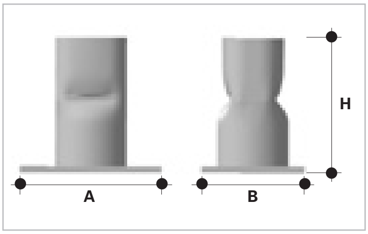
TL - long SAFELIFT

Loads (tons)	1	1,5	3	4	5	6	8	10	12
H	120	120	200	250	250	250	290	320	320
F1	98	98	130	175	175	175	210	225	225
F2	22	22	70	75	75	75	80	95	95
F3	62	62	95	123	123	123	145	145	145
F4	58	58	105	127	127	127	145	175	175

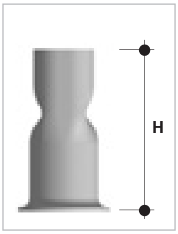
DIMENSIONS

Dimensions in mm

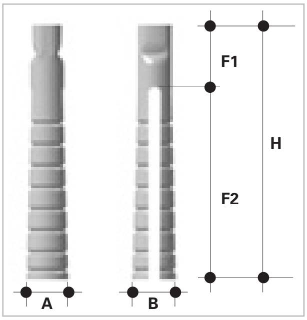
TB



TB2



TT



TB - SAFELIFT base

Loads (tons)	1	1,5	3	4	5	6	8	10	12
H	52	52	74	105	126	126	143	170	190
A	50	50	100	110	120	120	150	160	160
B	50	50	70	80	90	90	100	120	120

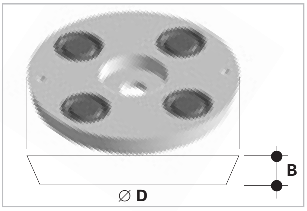
TB2 - SAFELIFT

Loads (tons)	1	1,5	3	4	5	6	8	10	12
H	60*		100	120	120	120**	160	180	200

*for values D1-D2-D3, see the values for 1.5 ton loads - “sections” on page 8.
**for values D1-D2-D3, see the values for 4 ton loads - “sections” on page 8.

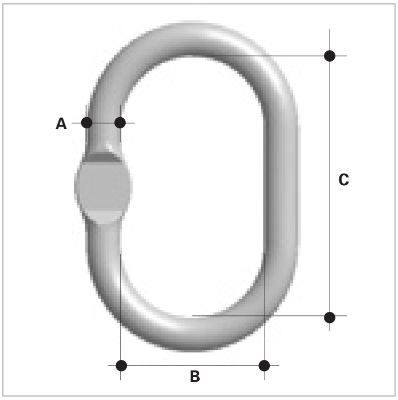
TT - SAFELIFT double-T

Loads (tons)	6	6	6	10	10	10
H	260	330	430	280	350	430
F1	111	111	115	140	140	140
F2	149	219	315	140	210	290
A	55	55	58	72,1	74,9	78
B	70	75	76	75,4	78,3	81,7



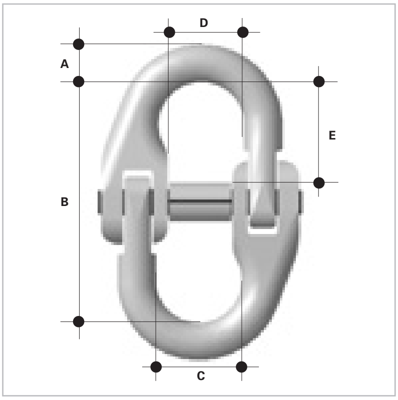
SPACER

Loads (tons)	1-1,5	3	4-5-6	8-10-12
Ø D	65	85	100	125
B	10	10	14	15



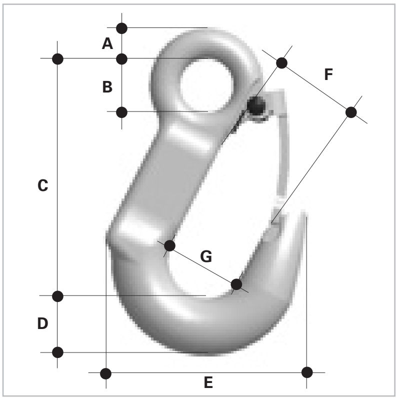
RING

Loads (tons)	1-1,5	3	4-5-6	8-10-12
A	16	18	24	32
B	60	75	94	110
C	110	135	152	200



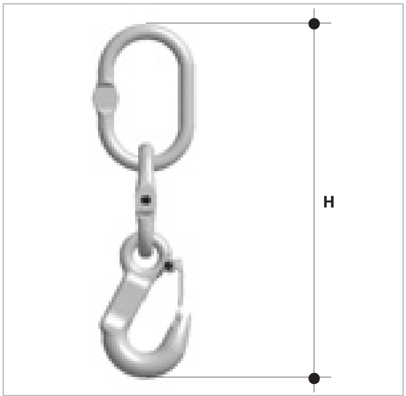
JOINT

Loads (tons)	1-1,5	3	4-5-6	8-10-12
A	10	16	18	23
B	68	86	103	117
C	23	32	41	45
D	22	28	35	43
E	29	35	43	48



HOOK

Loads (tons)	1-1,5	3	4-5-6	8-10-12
A	10	16	21	28
B	16	26	31	38
C	75	125	145	195
D	19	130	40	56
E	68	104	125	175
F	16	26	30	45
G	24	40	44	66



ARTICULATED HOOK

Loads (tons)	1-1,5	3	4-5-6	8-10-12
H	288	394	464	600

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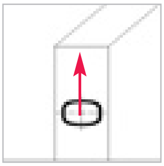
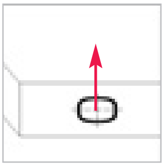


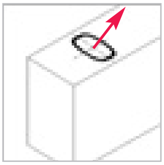
Rotating in air lift

Position the SAFELIFT so that the main side is against the direction of lift and in line with the thickness of the concrete element.
The diagram here shows the preferred direction of lifting, though this is not binding.

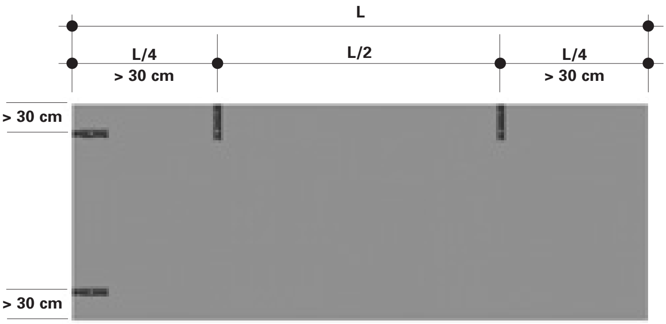


Edge lift

The SAFELIFT needs to be positioned so that it is symmetrical to the centre of gravity of the precast element, respecting the min distances from the edge: L/4 and L/2 are for a linear precast element with a constant section and may vary to suit the position of the centre of gravity (see page 29).

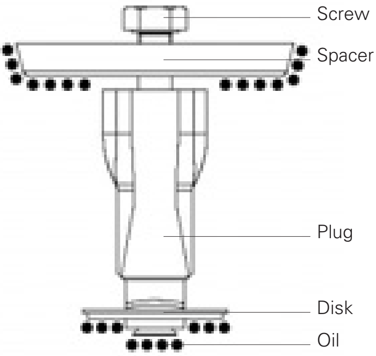


Inclined lift



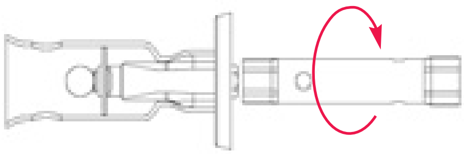
The SAFELIFT is placed in the form using the fixing set (fixing plug + spacer + screw), which has a spacer and long screw for wooden forms or a magnetic spacer and medium length screw for metal forms.

SURFACES TO BE OILED

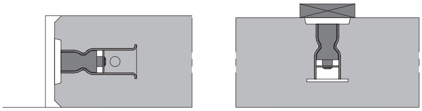


POSITIONING PROCEDURE

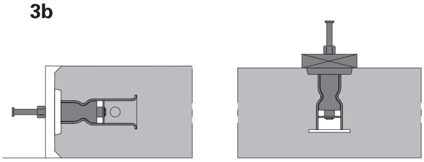
1. Oil the surfaces of the fixing set where these come into contact with the concrete (i.e., the spacer and the lower rubber disk).
2. Insert the plug into the SAFELIFT.



3a



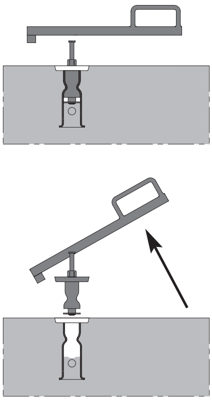
3b



3. Fix as follows:
a. without drilling the form/bracket, insert the medium-length screw through the spacer in the expansion plug and tighten until the rubber expands and holds the SAFELIFT in place. Now fix the SAFELIFT to a wooden form/bracket by nailing the spacer to it or to a metal form/bracket using the magnetic spacer;

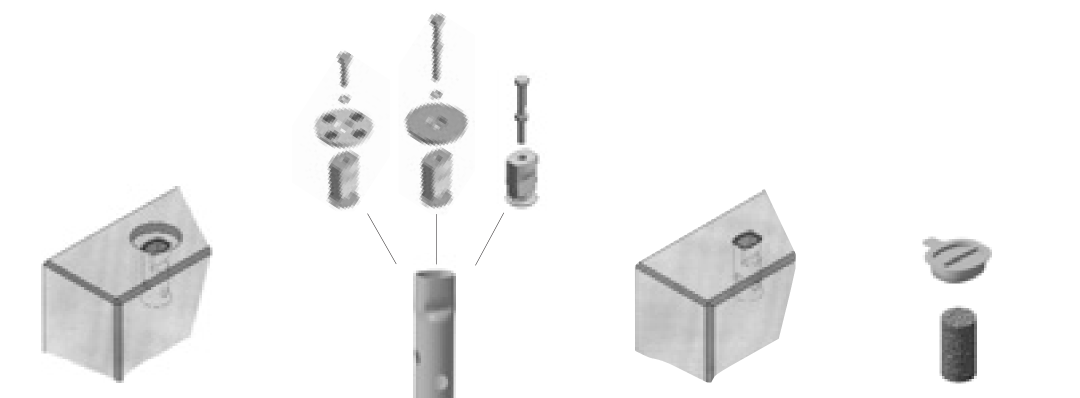
b. by drilling the form/bracket, insert the long screw through the form/bracket and the spacer into the expansion plug. Then tighten the screw or counter-nut until the rubber expands and pushes the SAFELIFT towards the edge, holding it in place;

c. at the precaster's discretion.



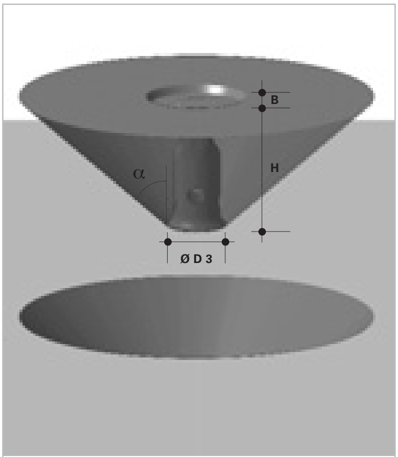
If the SAFELIFT has been fixed using method 3a above:
1. open the edge of the form, undo the screw and extract it a couple of centimetres to loosen the rubber within the SAFELIFT;
2. extract the fixing set using the extractor lever.

If the SAFELIFT has been fixed using method 3b above:
1. undo the counter-nut and remove the screw and to open the edge of the form; loosen the rubber within the SAFELIFT;
2. return the screw to the fixing set and tighten slightly to extract this using the extractor lever.



With spacer   Without spacer   Plugs used to close tube

CONCRETE CONE LOADS (tension only)



H = SAFELIFT height
B = spacer thickness
D3 = width of base of tube

B.S.Italia's aim in introducing this new insert is to promote **max safety** not just in terms of accident **prevention**, but also with regard to the **quality** of the precast element.
To safeguard this quality, the first thing to consider when choosing a SAFELIFT is the truncated cone-shaped portion of concrete around the SAFELIFT, as this will be subject to stress caused by movement. **If a full truncated cone (i.e., the width of the element is equal to 2H+D3), no ties or confinement are needed.**
The strength of the concrete and the type of tube must be considered in order to establish the load capacity of the SAFELIFT. All types of movement are possible if the values shown in the table below are respected.
The loads shown below have been calculated using a law that identifies the ultimate surface of the concrete cone. This law is based on many trials carried out in our laboratories.
The "upper" limits have been based on "dry" load tests on the SAFELIFT.

SAFELIFT 1 ton

Type	Geometry			Rc = 150		Rc = 200		Rc = 250		Rc = 300		Rc = 350	
	D3	H	B	Load	γsic	Load	γsic	Load	γsic	Load	γsic	Load	γsic
TB2	3,5	6,0	1,0	2,34	2,34	2,84	2,84	3,29	3,29	3,72	3,72	4,00	4,00

SAFELIFT 1,5 ton

Type	Geometry			Rc = 150		Rc = 200		Rc = 250		Rc = 300		Rc = 350	
	D3	H	B	Load	γsic	Load	γsic	Load	γsic	Load	γsic	Load	γsic
TB	5,0	5,2	1,0	2,61	1,74	3,16	2,11	3,67	2,45	4,14	2,76	4,59	3,06
TS	3,5	8,0	1,0	3,12	2,08	3,78	2,52	4,39	2,93	4,61	3,07	4,61	3,07
TL	3,5	12,0	1,0	4,49	2,99	4,61	3,07	4,61	3,07	4,61	3,07	4,61	3,07

D3, B and H in cm • Rc in kg/cm² • Load in tons

CONCRETE CONE LOADS (tension only)

SAFELIFT 3 ton													
Type	Geometry			Rc = 150		Rc = 200		Rc = 250		Rc = 300		Rc = 350	
	D3	H	B	Load	γsic	Load	γsic	Load	γsic	Load	γsic	Load	γsic
TB	7,0	7,4	1,0	4,87	1,62	5,90	1,97	6,84	2,28	7,73	2,58	8,57	2,86
TB2	6,2	10,0	1,0	6,27	2,09	7,60	2,53	8,82	2,94	9,95	3,32	11,03	3,68
TS	6,2	13,0	1,0	8,35	2,78	10,11	3,37	11,73	3,91	12,40	4,13	12,40	4,13
TM	6,2	16,5	1,0	10,66	3,55	12,40	4,13	12,40	4,13	12,40	4,13	12,40	4,13
TL	6,2	20,0	1,0	12,40	4,13	12,40	4,13	12,40	4,13	12,40	4,13	12,40	4,13

SAFELIFT 4 ton													
Type	Geometry			Rc = 150		Rc = 200		Rc = 250		Rc = 300		Rc = 350	
	D3	H	B	Load	γsic	Load	γsic	Load	γsic	Load	γsic	Load	γsic
TB	8,0	10,5	1,4	8,40	2,10	10,18	2,54	11,81	2,95	13,34	3,33	14,78	3,69
TS	7,2	16,5	1,4	12,59	3,15	15,25	3,81	15,81	3,95	15,81	3,95	15,81	3,95
TM	7,2	21,0	1,4	15,81	3,95	15,81	3,95	15,81	3,95	15,81	3,95	15,81	3,95
TL	7,2	25,0	1,4	15,81	3,95	15,81	3,95	15,81	3,95	15,81	3,95	15,81	3,95

SAFELIFT 5 ton													
Type	Geometry			Rc = 150		Rc = 200		Rc = 250		Rc = 300		Rc = 350	
	D3	H	B	Load	γsic	Load	γsic	Load	γsic	Load	γsic	Load	γsic
TB	9,0	12,6	1,4	11,22	2,24	13,59	2,72	15,77	3,15	16,37	3,27	16,37	3,27
TS	7,4	16,5	1,4	12,89	2,58	15,62	3,12	16,37	3,27	16,37	3,27	16,37	3,27
TM	7,4	21,0	1,4	16,37	3,27	16,37	3,27	16,37	3,27	16,37	3,27	16,37	3,27
TL	7,4	25,0	1,4	16,37	3,27	16,37	3,27	16,37	3,27	16,37	3,27	16,37	3,27

SAFELIFT 6 ton													
Type	Geometry			Rc = 150		Rc = 200		Rc = 250		Rc = 300		Rc = 350	
	D3	H	B	Load	γsic	Load	γsic	Load	γsic	Load	γsic	Load	γsic
TB	9,0	12,6	1,4	11,22	1,87	13,59	2,27	15,77	2,63	17,81	2,97	19,74	3,29
TB2	7,2	12,0	1,4	9,0	1,50	10,90	1,82	12,65	2,11	14,28	2,38	15,83	2,64
TS	7,4	16,5	1,4	12,89	2,15	15,62	2,60	18,13	3,02	20,47	3,41	22,07	3,68
TM	7,4	21,0	1,4	16,37	2,73	19,83	3,31	22,07	3,68	22,07	3,68	22,07	3,68
TL	7,4	25,0	1,4	19,15	3,19	22,07	3,68	22,07	3,68	22,07	3,68	22,07	3,68

D3, B and H in cm • Rc in kg/cm² • Load in tons

CONCRETE CONE LOADS (tension only)

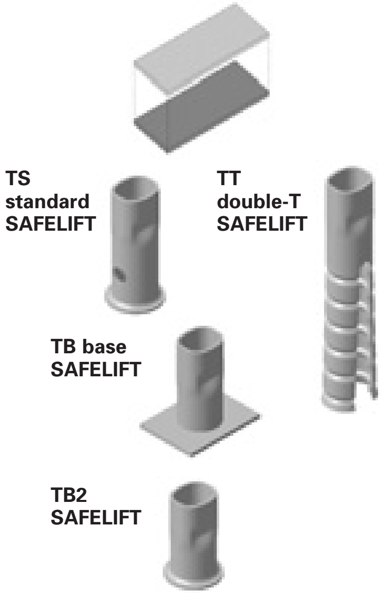
SAFELIFT 8 ton													
Type	Geometry			Rc = 150		Rc = 200		Rc = 250		Rc = 300		Rc = 350	
	D3	H	B	Load	γsic	Load	γsic	Load	γsic	Load	γsic	Load	γsic
TB	10,0	14,3	1,5	14,12	1,76	17,10	2,14	19,84	2,48	22,41	2,80	24,83	3,10
TB2	9,3	16,0	1,5	15,15	1,89	18,36	2,29	21,30	2,66	24,06	3,01	26,66	3,33
TS	9,3	19,0	1,5	18,27	2,28	22,13	2,77	25,68	3,21	29,00	3,62	32,13	4,02
TM	9,3	24,0	1,5	23,27	2,91	28,19	3,52	32,71	4,09	34,31	4,29	34,31	4,29
TL	9,3	29,0	1,5	27,88	3,49	33,87	4,22	34,31	4,29	34,31	4,29	34,31	4,29

SAFELIFT 10 ton													
Type	Geometry			Rc = 150		Rc = 200		Rc = 250		Rc = 300		Rc = 350	
	D3	H	B	Load	γsic	Load	γsic	Load	γsic	Load	γsic	Load	γsic
TB	12,0	17,0	1,5	19,65	1,97	23,81	2,38	27,63	2,76	31,20	3,12	34,58	3,46
TB2	9,3	18,0	1,5	17,23	1,72	20,88	2,09	24,23	2,42	27,36	2,74	30,32	3,03
TS	9,3	22,0	1,5	21,31	2,13	25,81	2,58	29,95	2,99	33,82	3,38	36,47	3,65
TM	9,3	27,0	1,5	26,09	2,61	31,61	3,16	36,47	3,65	36,47	3,65	36,47	3,65
TL	9,3	32,0	1,5	30,41	3,04	36,47	3,65	36,47	3,65	36,47	3,65	36,47	3,65

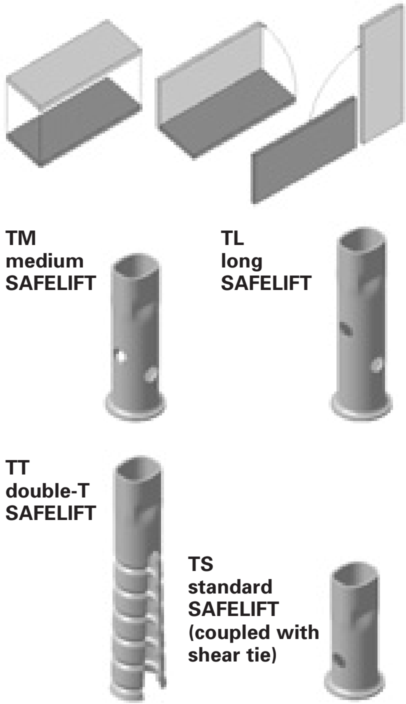
SAFELIFT 12 ton													
Type	Geometry			Rc = 150		Rc = 200		Rc = 250		Rc = 300		Rc = 350	
	D3	H	B	Load	γsic	Load	γsic	Load	γsic	Load	γsic	Load	γsic
TB	12,0	19,0	1,5	22,33	1,86	27,05	2,25	31,39	2,62	35,45	2,95	39,28	3,27
TB2	9,7	20,0	1,5	19,98	1,67	24,21	2,02	28,09	2,34	31,72	2,64	35,15	2,93
TS	9,7	22,0	1,5	22,10	1,84	26,78	2,23	31,07	2,59	35,09	2,92	38,89	3,24
TM	9,7	27,0	1,5	27,18	2,27	32,93	2,74	38,21	3,18	43,15	3,60	47,82	3,98
TL	9,7	32,0	1,5	31,82	2,65	38,55	3,21	44,73	3,73	50,51	4,21	50,51	4,21

D3, B and H in cm • Rc in kg/cm² • Load in tons

Allowed movement



Allowed movement



The use of tension bars is obligatory when a SAFELIFT is subject to tension and the concrete truncated cone is partial. If the SAFELIFT is subject to shear (regardless of the truncated cone) or inclined lift, shear ties must be used together with confinement via reinforcement of the concrete element. Tying is therefore important here and needs to be assessed on a case to case basis to suit the forces in play throughout the production and erection process. This means that **potential stress** (tension, shear, etc.) and the **type of concrete** used must be taken into account when deciding upon the appropriate form of tying, which also needs to suit the **reinforcement in the precast** concrete element, thus contributing to confinement. This needs to be borne in mind when using the following pages on tying of the insert.

DEFINITIONS

SWL - safe working load

By this we mean the max load that can be applied to a lifting insert.

UL - ultimate load

By this we mean the load that causes the system to fail.

Product	FS
Lifting inserts	3 dry 2,5 in concrete
Hook shackle	5

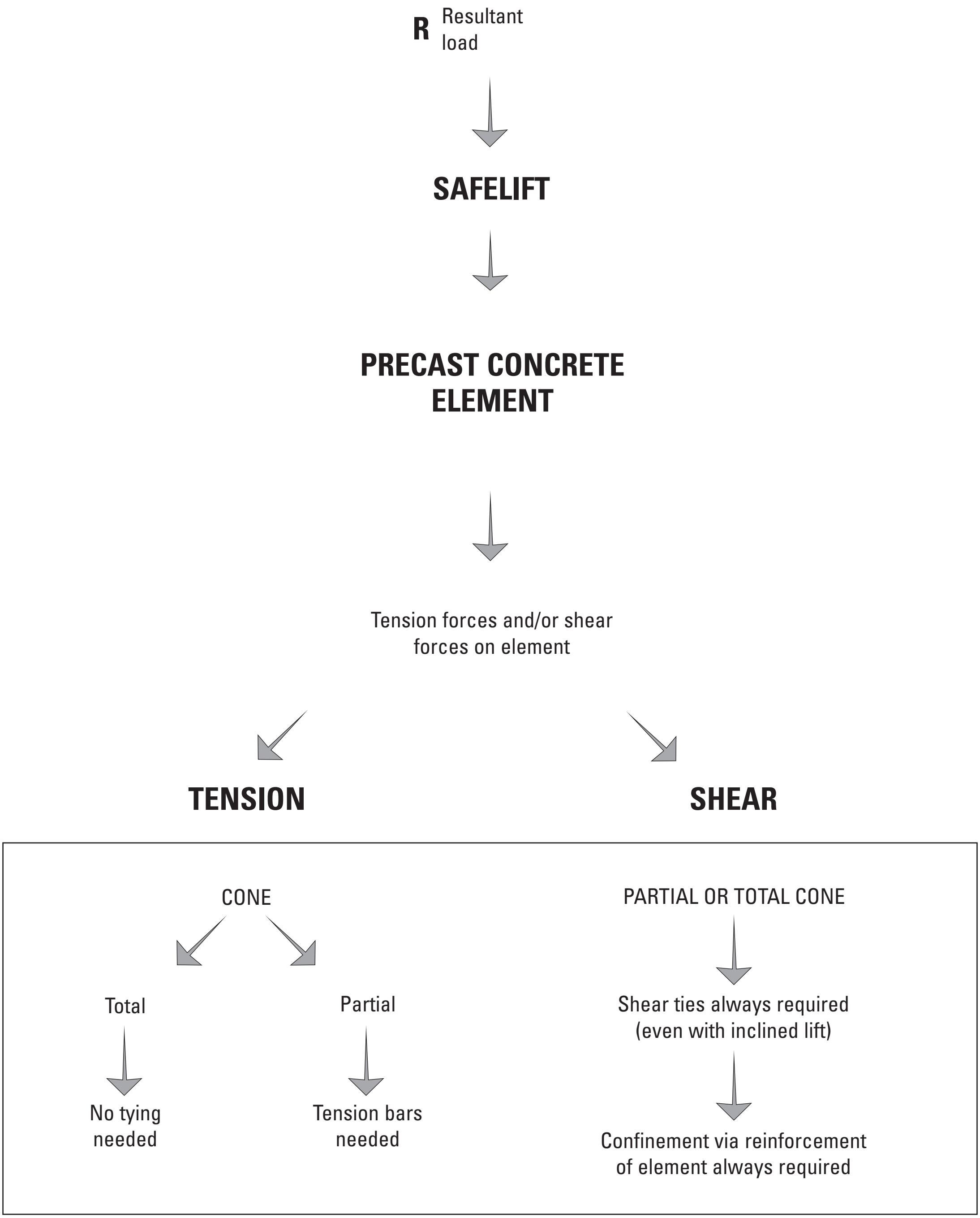
SF - safety factor

SF = UL ÷ SWL

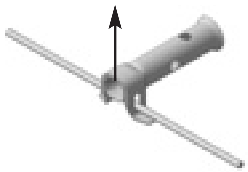
The marked loads on the SAFELIFT tubes are the max applicable loads on each insert (SWL), but only if the tube has adequate tying and confinement and is surrounded by sufficiently strong concrete. As a result of tension forces, the load shown with the prescribed safety factor is full. The load **is halved in the case of shear forces. However, in the case of edge lifting, the weight to be lifted will be half the total weight of the element (see page 30).**

Only this way max safety is assured with perfect interaction of the insert and the concrete, thus increasing the guarantee against the appearance of cracks during the various transitional stages.

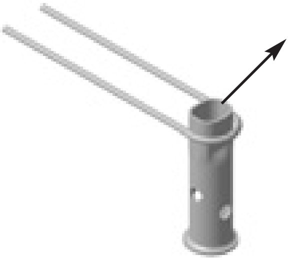
For this reason, **B.S.Italia** strongly advises against using inserts without tension and/or shear reinforcement: a simple accidental knock during movement could easily break the supporting cone of concrete and so compromise safety.


R Resultant load
SAFELIFT
PRECAST CONCRETE ELEMENT
Tension forces and/or shear forces on element
TENSION
SHEAR
CONE
Total
No tying needed
Partial
Tension bars needed
PARTIAL OR TOTAL CONE
Shear ties always required (even with inclined lift)
Confinement via reinforcement of element always required

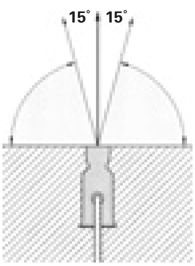
SHEAR

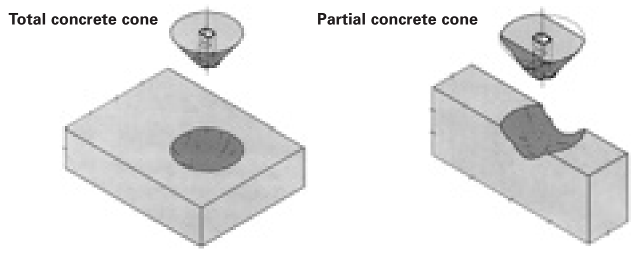


Rotating in air



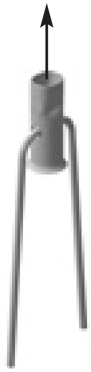
Inclined lift





TENSION: the use of tension bars is obligatory with a partial concrete cone.

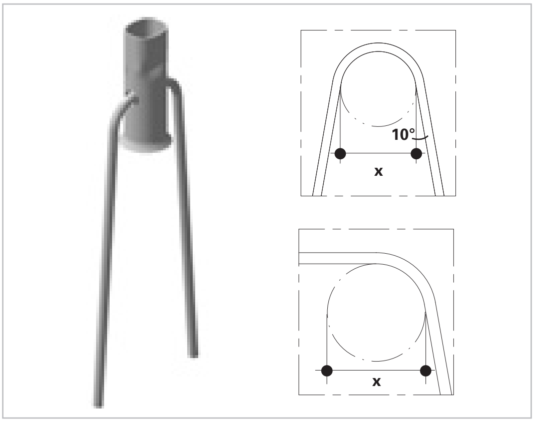
TENSION



SHEAR: the use of shear ties is not linked to the concrete cone, but is always obligatory with edge lifting/rotating in air or where the inclination of the lift is > 15° from the vertical axis of the SAFELIFT. Confinement is also obligatory with reinforcement of the concrete element (see page 23).

Min flat buckling strength of concrete:
TS, TM, TL and TT Rc ≥ 150 kg/cm²
TB Rc ≥ 300 kg/cm²
TB2 Rc ≥ 350 kg/cm²

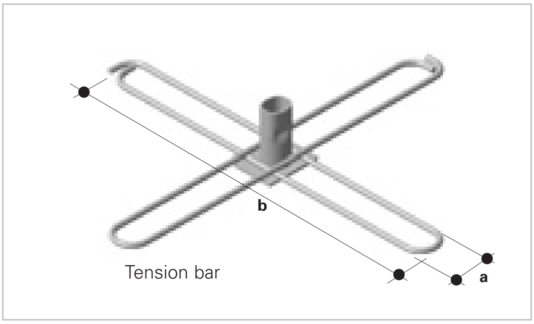
Feb44K steel or higher (e.g. BSt500S)



Alternative tension bars

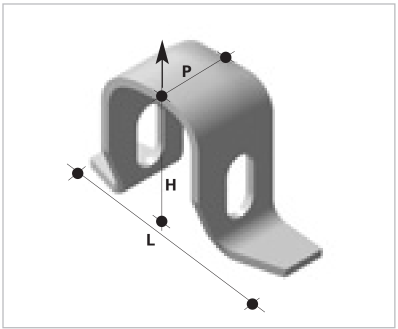
Load (tons)	1	1,5	3	4	5	6	8	10	12
Bar Ø	8	8	10	12	12	14	16	18	18
Total length	500	700	800	900	1200	1300	1500	1800	2200
Bend Ø x min.	60	60	80	120	120	140	160	200	200

TB Feb44K steel or higher (e.g. BSt500S)



Load (tons)	1	1,5	3	4	5	6	8	10	12
Bar Ø	8	8	8	10	10	12	12	14	14
a	50	50	70	90	90	90	110	110	120
b	300	400	600	700	700	800	1000	1100	1200

Shear tie
for lifting in one direction only.

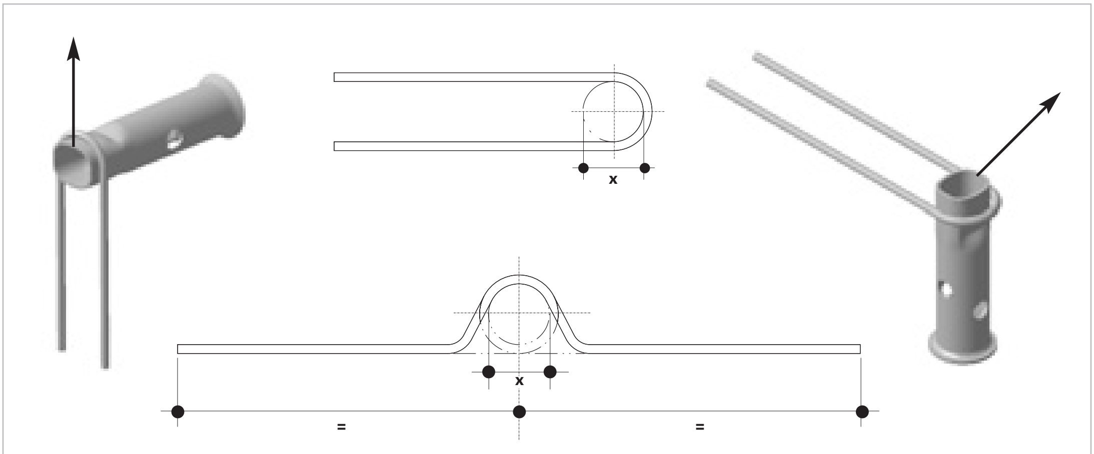


Min flat stripping strength of concrete during edge lifting:
TS, TM and TL Rc ≥ 150 kg/cm²
Min strength of concrete during rotating in air:
TM and TL Rc ≥ 350 kg/cm²

Advantages of the shear tie
1. Immediate and correct positioning
2. Max shear resistance

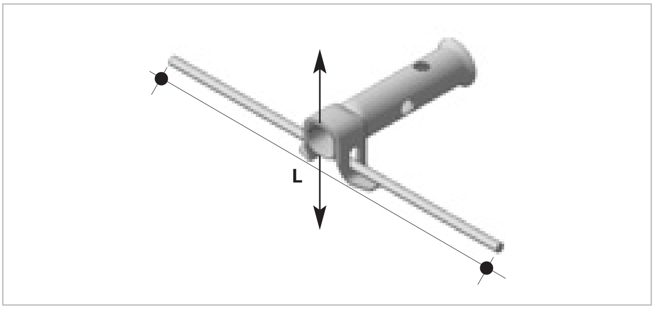
Load (tons)	1-1,5	3	4	5-6	8	10	12
L	63	108	131	144	152	175	168
H	37	67,5	91,5	91	105,5	114	124
P	20	33	50	50	60	60	60

Alternative ties Feb44K steel or higher (e.g. BSt500S)
*The shear tie needs to be placed at the end of the tube, with min rebar coating.



Load (tons)	1	1,5	3	4-5-6	8-10-12
Tie Ø	6	8	10	10	12
Total length	500	500	800	1000	1200
Bend Ø x min.	32	32	56	70	82

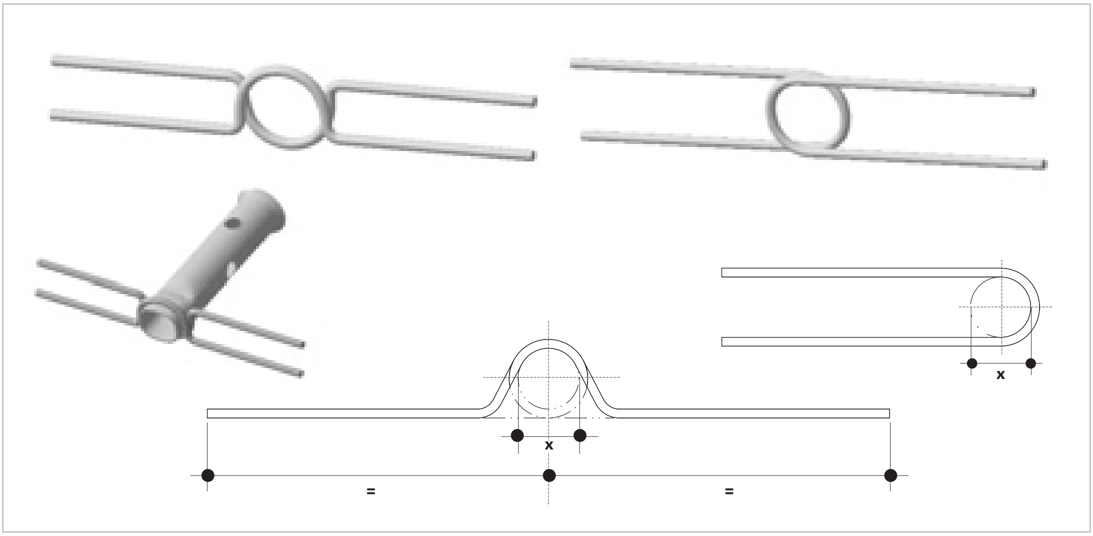
Steel **rebar** feb 44k or higher (es.BSt500S) in case of lifting in both directions.



Load (tons)	1-1,5	3	4-5-6	8-10-12
Ø Tie	6	12	16	20
L	400	600	800	1000

Alternative ties Feb44K steel or higher (e.g. BSt500S)

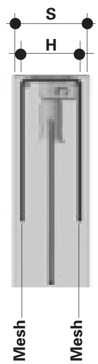
* The shear tie needs to be placed at the end of the tube, with min rebar coating.

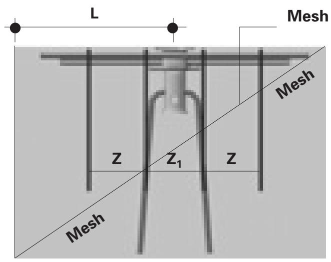


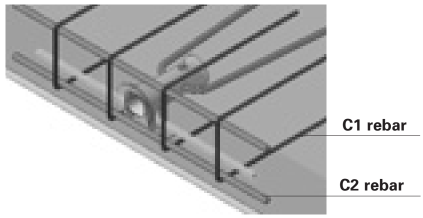
Load (tons)	1	1,5	3	4-5-6	8-10-12
Ø Tie	6	8	10	10	12
Total length	500	500	800	1000	1200
Bend Ø x min.	32	32	56	70	82

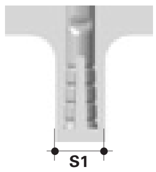
The SAFELIFT must be inserted in concrete elements with the min thickness per load shown in the table below.

Load (ton)	1	1,5	3	4	5	6	8	10	12
S min.	80	80	120	150	160	160	200	200	200
S1 min.						130		140	









Mesh
2 x 5 mm diameter, 15 x 15 mm meshes in controlled Feb44k steel (or equivalent).

N.B.: the value of S1 must be measured at the end of the tube.

C1 rebars

Feb44k steel or higher (e.g. BSt500S).
* when using alternative shear ties (see page 21), the values of z_1 and z must be cut be 30% and the number of rebars increased by 2.
H = panel thickness < 40 mm
(or min envisaged rebar coating)

C2 rebars

2 x Feb44k steel rebars or higher (e.g. BSt500S).

Confinement

Local reinforcement of the insert, plus the specific tying, to get the highest performance of the SAFELIFT by absorbing the peak **shear force** values. This can be omitted or reduced in the following cases:
- when the nominal reinforcement of the precast element guarantees sufficient confinement of the concrete around the insert;
- when the thickness of the precast element or the strength of the concrete are higher than the required values.

Confinement reinforcement consists of two straight rebars (C2) and a number of bent rebars (C1).

	Load (tons)	1-1,5	3	4-5-6	8-10-12
C1	**Quantities***	2	2	4	6
	Ø Rebar	8	8	8	10
	Total length	800	1000	1200	1500
	Z_1 *	80	100	130	150
	Z *			60	60
C2	**Ø Rebar**	8	10	12	14
	Total length	600	800	1000	1200
	L	300	400	500	600

B.S.Italia®
Styl-Comp Group

The resultant load R on each SAFELIFT insert is calculated using the following formula:

$$R = \frac{P + (Q_a \times A_{SC})}{N} \times Q_b \times Q_c \times Q_d$$

Use the following design parameters to choose the right SAFELIFT:

Parameters:

- **P** weight
- **A_{sc}** element surface in contact with form
- **N** number of inserts to use
- **Q_a** adhesion effect
- **Q_b** dynamic effect
- **Q_c** cable inclination
- **Q_d** lifting method

Requirements:

- Requirements for flat stripping and edge lift:
  TS, TM, TL and TT Rc ≥ 150 kg/cm²;
  TB Rc ≥ 300 kg/cm²;
  TB2 Rc ≥ 350 kg/cm².

- Min strength of concrete during rotating in air:
  TM and TL Rc ≥ 350 kg/cm².

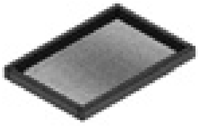
- SAFELIFT in confined smooth concrete, properly mixed and compacted (i.e., porosity and air entrainment < 6% volume, etc.) and crack-free concrete in any case, without separation or micro-cracking.

- Design, reinforcement, elements, production methods, quality and concrete control in compliance with state of the art, current standards and laws, such as the Italian Ministerial Decrees and Eurocodes.

DESIGN PARAMETERS

Q_a ADHESION EFFECT (see page 26)

Q_a min = 1,15



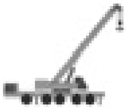
A_{SC} x 100 - 350 kg/m²
mean

from 2 x P to 4 x P
Stiffened panels

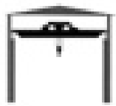
Q_b DYNAMIC EFFECT (see page 27)

Q_b min = 1,15

Suggested coefficients

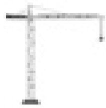


1,15 - 1,3
Moving means



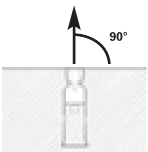
1,2 - 1,6
Fixed means

1,2 - 3,0

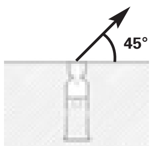


1,15 - 1,3
Slow lift

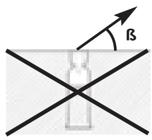
Q_c CABLE INCLINATION (see page 28)



Q_c = min 1
Vertical lift

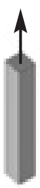


Q_c = max 1,41
Cable inclination = 45°

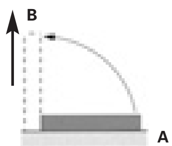


Cable inclination < 45° NOT allowed (angle ß).

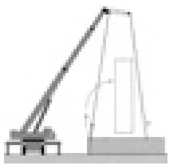
Q_d LIFT METHOD (see page 29)



Q_d = min 1
Vertical lift



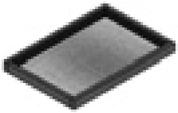
Q_d = 0,5 (stage A)
Q_d = 1 (stage B)
Edge lift



Q_d = 1,3
Rotating in air

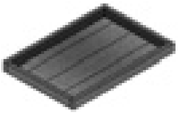
Q_d = 2
4 anchor points with just two points under tension (no pulley)

Suggested values



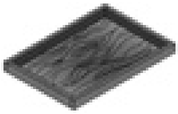
> 100 Kg/m²

Oiled steel forms



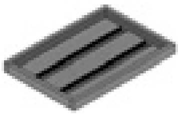
> 200 Kg/m²

Oiled smooth wooden forms



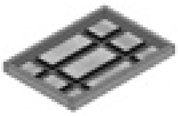
> 300 Kg/m²

Oiled rough wooden forms



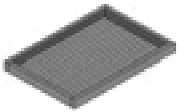
2 x P

Form with 2 lines of stiffening



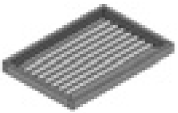
4 x P

Form with 2+2 lines of stiffening



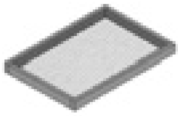
> 350 Kg/m²

Form with shallow matrix < 1cm



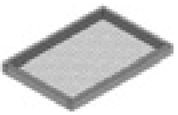
> 500 Kg/m²

Form with deep matrix < 3cm



> 100 Kg/m²

Form with chemical retarding paper



> 200 Kg/m²

Form with chemical retarding paste

The contact between the cast concrete and the form generates adhesion forces that oppose stripping, thus amplifying the loads, and so need to be taken into consideration when choosing the size of the SAFELIFT insert. This coefficient can be expressed as a simple factor multiplied directly by P, or as a specific weight to be multiplied by A_{sc} and then added to P.

Since stricter standards do not exist at present, the Norwegian technical rules are adopted. These require the following Q loads to be added to the weight/m² of the precast element.

- Steel form with stripping agent Q_a > 100 kg/m²
- Painted wooden form with stripping agent Q_a > 200 kg/m²
- Rough wooden form with stripping agent Q_a > 300 kg/m²
- Rubber form (matrix) Q_a > 350 kg/m²

The Q_a cannot, in any case, be less than 15% the weight of the precast element.

- In practice and theory, a **min value of double the weight of the element is** required in the case of TT elements and all cases where the element geometry includes two parallel strips of concrete stiffening, to take into account the risk of attrition.

- Again, a **min value of four times the weight of the element** is required in the case of box elements and all cases where the element geometry includes perpendicular sections of concrete (stiffening), even if just around the edges.

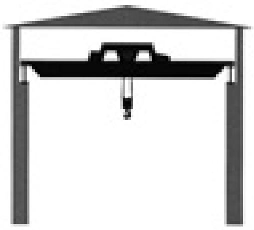
- The various form systems can change the values further (e.g. self-reacting forms, etc.).

Note that the amplifying load Q_a described above (100 kg/m², 300 kg/m², etc.) must be multiplied by the surface of the precast element coming into contact with the form (greater than the flat surface) to assess adhesion to the form.

Moreover, synchronising of the lift is essential when using two bridge cranes (otherwise the load isn't equally divided and the lift becomes uneven, creating bending moment and/or twist that is difficult to control).

Always use spreader beams during stripping to avoid inclined lift on elements made from fresh concrete.
Friction and other secondary effects, like prestressing, also need to be considered.

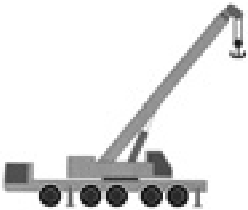
Suggested values
Fixed means



1,2 - 1,6

1,15 - 1,3

Suggested values
Moving means



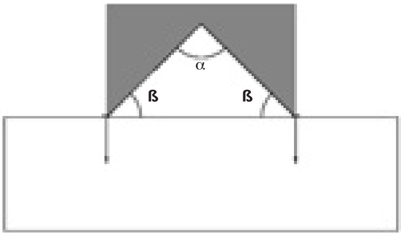
Fast lifting **1,2 - 1,6**
Slow lifting **1,15 - 1,3**

1,2 - 3,0

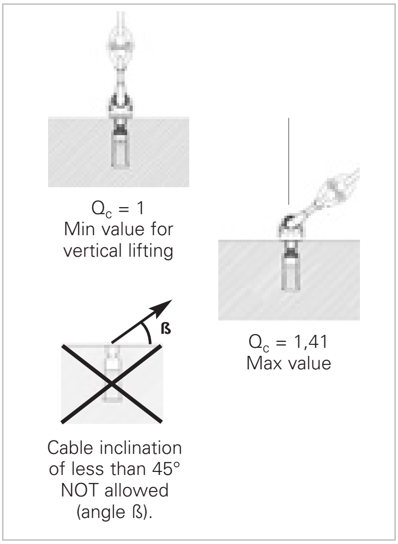
The presence of adhesion effect normally eliminates any dynamic force. However, some designers, to err on the safe side, always calculate the dynamic effect due to the immediate acceleration of the element after adhesion or to comply with **the min value prescribed by law (Italian Ministerial Decree 87, which fixes: $Q_b \geq 1.15$ as a standard value).**

The effects of dynamic loads (always present when the element is in motion) generate amplification factors which must be properly assessed and considered.
According to DIN 15018, the dynamic coefficient can vary between 1.15 and 3.0 due to the speed of the movement and type of crane.
For instance, a precast production crane that moves "slowly" on rails can have an amplification coefficient of between 1.15 and 1.30.
Obviously, a self-moving crane has to have the right level of structural rigidity and sit on stable ground (without this stability, the crane boom would oscillate and cause unwanted stress).
The values suggested for the fixed and mobile lifting systems are purely indicative. These could easily be higher if the means of transport are very fast and/or have other negative influences.

Q_c CABLE INCLINATION

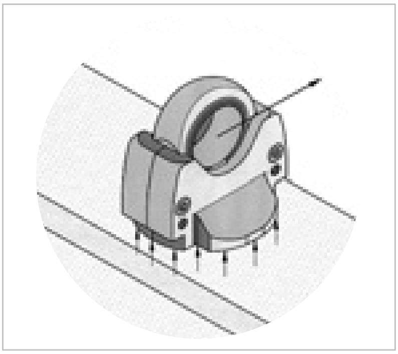


Any inclination of the cables automatically generates an increased load with a horizontal component that must be evaluated.
The TORRE is marked with a vertical anchor load (without horizontal force components along the long axis of the plate).
For this reason, it is always necessary to consider the angle between the cable and the long axis of the TORRE plate.



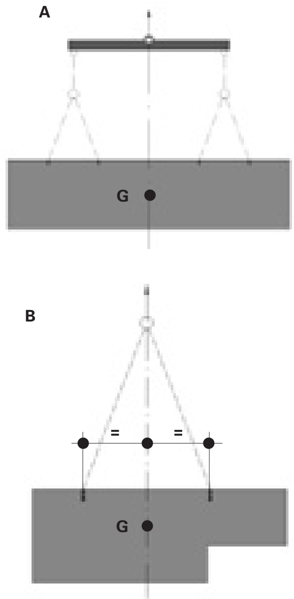
Q_c factor must be applied when the cable has an angle of inclination less than 90° (see table below).

Initial angle		Q_c
α	β	coefficient
0°	90°	1,00
15°	82°	1,01
30°	75°	1,04
45°	67°	1,08
60°	60°	1,16
75°	52°	1,26
90°	45°	1,41
> 90°	< 45°	not allowed
α = angle between chain/chain β = angle between chain/insert		



Inclined cable

The shackle underside always touches the surface of the precast element, no matter what the lifting method: this guarantees excellent distribution of the forces with discharge of the stress via the support surface.

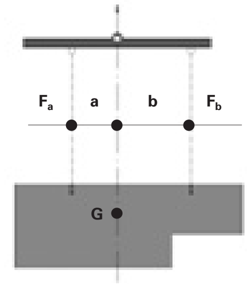


G = centre of gravity

Proper positioning of the SAFELIFT is crucial to ensure correct handling of precast panels. There are two different methods:

Method A: using a spreader beam, the centre of gravity of the element must be centred on the vertical lifting axis of the crane.
Method B: without a spreader beam, the SAFELIFT tubes must be symmetrical on the vertical axis of the element.

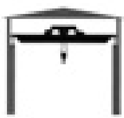
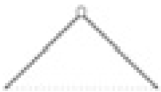
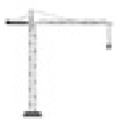
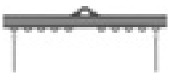
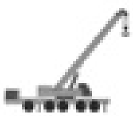
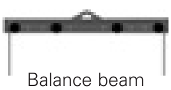
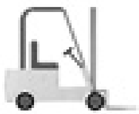
If the SAFELIFT is not symmetrical on the centre of gravity of the element, the weight component of each insert can be calculated as follows:



$$F_a = \frac{P \times b}{a + b}$$

$$F_b = P - F_a$$

N.B.: The overall stress on each tube must be calculated in view of all amplification coefficients (see page 25).

Machinery	**Equipment**
	 Chains
	 Fixed balance beam with chains
	 Balance beam with pulley and cables
	

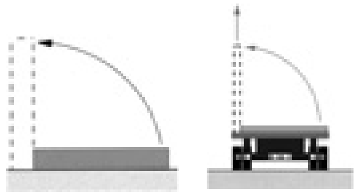
Procedure:

Having found the centre of gravity, several questions need to be answered to find the best lifting method. These questions concern all stages of the process, from stripping to erection:

1. What type of movement does the precast element undergo: edge lifting, partial edge lifting, rotating in air, level lifting, etc.?
2. How many hooks are needed to lift the precast element (1, 2, 3, 4, 8 or more) and is the weight distributed evenly?
3. What type of equipment is used for lifting (chains, fixed balance beams or pulleys)?
4. Does the lifting involve one or two hooking points?

Q_d LIFTING METHOD

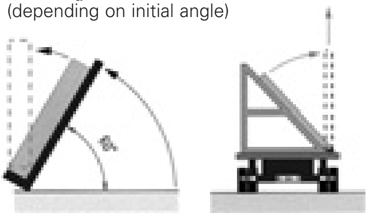
$Q_d = 0{,}5$



Edge lifting

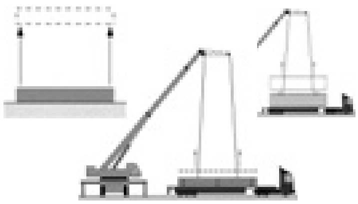
$0{,}5 < Q_d < 1$

(depending on initial angle)



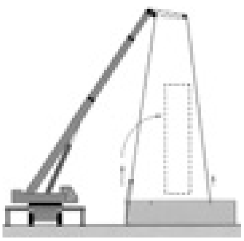
Semi-edge lifting

$Q_d = 1$



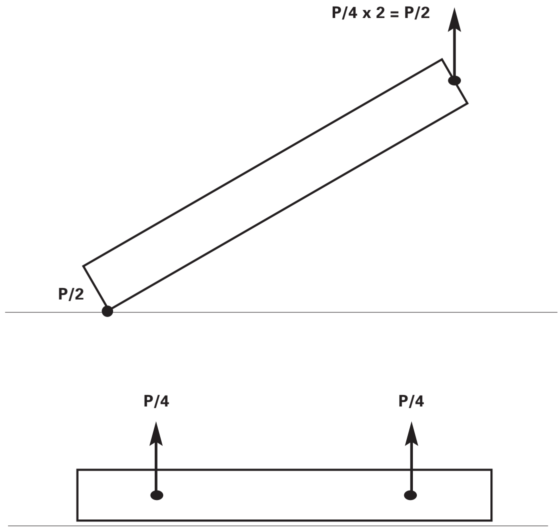
Vertical lift

$Q_d = 1{,}3$



Rotating in air

Edge lifting
The weight to be lifted is half the total weight.



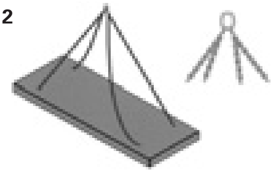
Lifting a precast element from its horizontal position to the vertical position requires a different evaluation: in this case, the weight to be lifted is half the total weight.

The lifting method (direction, speed, reciprocal distance between hooks, height of crane boom, starting position of the precast element, etc.) establishes the correct way to move the precast element. The following points in particular need to be borne in mind:

- The centre of gravity of the element needs to be considered when positioning the lifting inserts (they must be symmetrical): diagrams A and B on page 29 are the basis for lifting with the SAFELIFT system.
- If more than two lifting points are required, the SAFELIFT inserts must be sized to cater for the worst possible load conditions for the system.

The use of spreader arms and independent lifting methods is recommended to guarantee equal distribution of the loads on a single SAFELIFT (i.e., two winches on the same crane or two independent cranes).

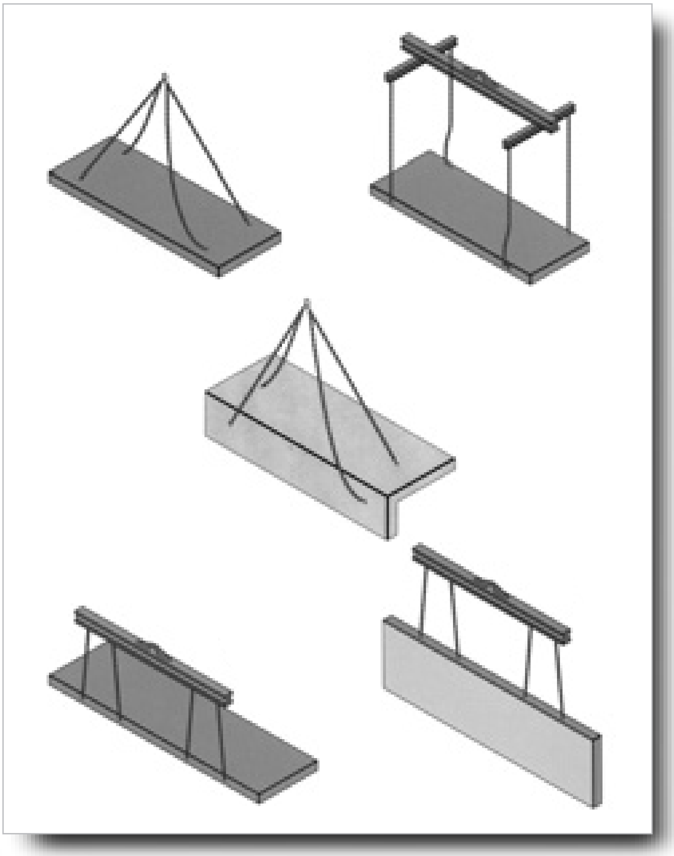
$Q_d = 2$

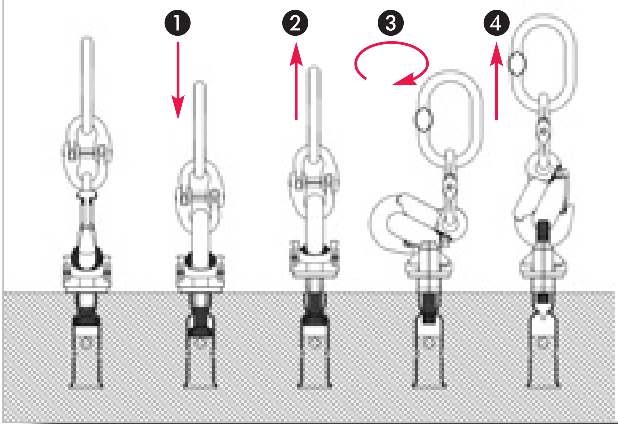


Multiple unbalanced lifting points
4 lifting points with only two points under tension. The weight is not divided into 4 equal parts, but is simply halved.

If pulleys are not being used, the forces acting on a single SAFELIFT insert can't be calculated properly. This may be due to incorrect positioning or the use of different cable lengths. The calculation must, therefore, always adopt the worst scenario.

N.B.: In the case of multiple lifting points with the **SAFELIFT inserts horizontally positioned**, these can only support half the marked load (see page 17) due to shear.
Moreover, if the multiple lifting points are not equalised with pulleys, you need to use the $Q_d = 2$ lifting method factor.

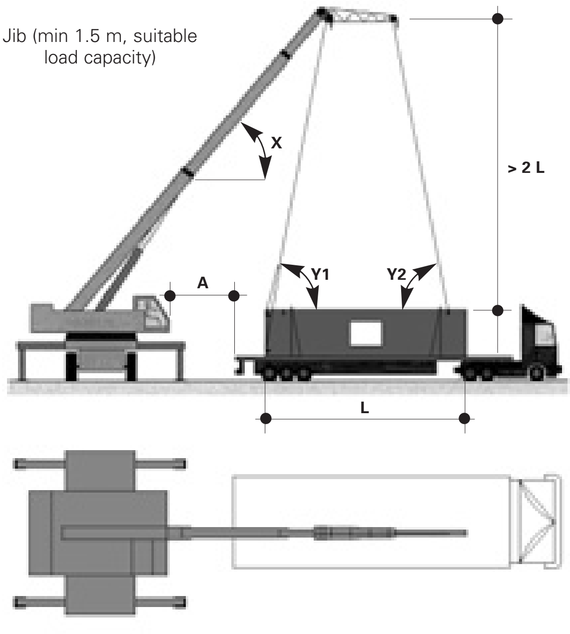




The shackle can also be removed without having to remove the hook.

How to detach the shackle:

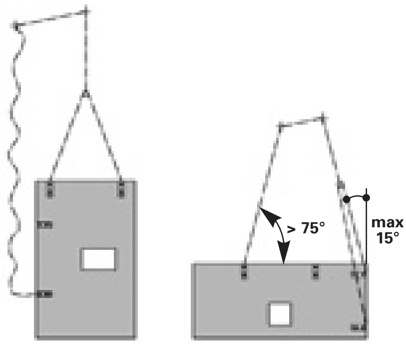
1. Remove the hook or turn to the horizontal.
2. Lift the shackle pocket.
3. Turn the shackle by 90°.
4. Lift the shackle plus hook out of the insert.



Note: Y1 = Y2; X < Y1
A = appropriate safety distance

Rotation in air

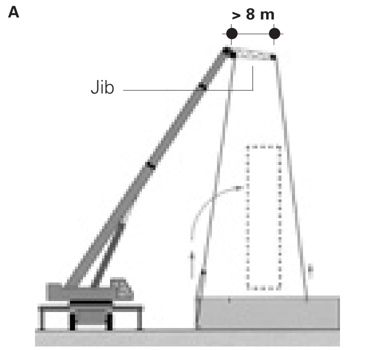
Rotation in air is one of the most critical movements in any type of erection operation and is typical for vertical facade panels. The amplification of the loads is effected by various factors, such as the speed of lift, crane boom inclination, the position of the inserts, the jib length, the type of cable and the pulleys.



Prescribed angles during rotation in air

Q_d = 1,3 (see page 30)
Erection of the precast element must guarantee total safety. The truck with the load must be directly under the crane boom or as close as possible to minimise the swinging of elements after lifting these from the trailer. The min distances and angles must be respected.

Rotating in air of a 10 m panel using a single crane

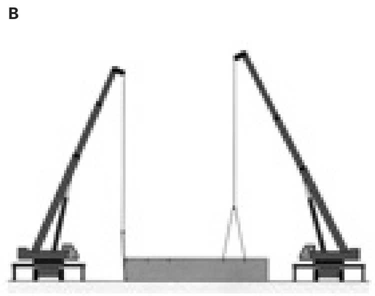


Crane with jib > 8 m

Recommendations

- Before starting the lifting, the crane should be aligned with the long side of the panel.
- Panels measuring 8 - 10 m: rotating in air must be done using a boom crane with a jib of min 1.5 m; use longer jibs to reduce the inclination angle of the cables.
- Panels longer than 10 m: a min 8.2 m jib must be used (A) or two cranes (B).
- The crane boom should be extended appropriately (2 L) and inclined (X < Y) to guarantee the safety distance between the panel and crane cabin.
- The crane operator must control movement using two independent lines and hooks.
- The erection workers must use cables that are long enough for the purpose and a suitable jib length.

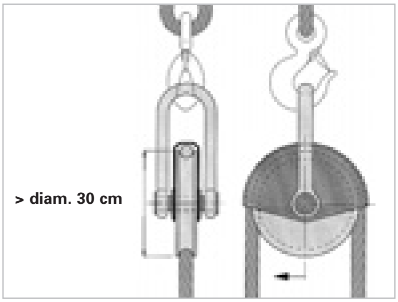
Rotating in air of 10 m panels using two cranes



Two cranes without jib

<u>Rotating in air of the panel should only start after respecting the following points:</u>

- Concrete strength > 350 kg/m^2.
- Suitable type of SAFELIFT, with ties, confined and correctly positioned.
- Evaluation of all amplification effects when calculating stress.§
- Use inspected shackles.
- Full respect for the information in this manual.
- Compliance with all design and safety rules and standards.



Pulley with cable guard

If only one double length cable is used instead of two cables, a suitable type of pulley must be used to guarantee:

- the cable does not slip off the guides in the pulley (a safety guard prevents this from happening);
- everything is fully efficient (smooth running, rotation and suitable load capacity).

Rings, loops, eyebolts and other equipment must not be used instead of a pulley.

The examples shown here refer to specific types of movement of the precast element. The stresses on the SAFELIFT due to each type of movement from stripping to erection must all be calculated to find the worst scenario and so the most suitable SAFELIFT can then be chosen.

Resultant load on the SAFELIFT

$$R = \frac{P + (Q_a \times A_{sc})}{N} \times Q_b \times Q_c \times Q_d$$

Parameters:

P weight

A_{sc} element surface in contact with form

N number of inserts to use

Q_a adhesion effect

Q_b dynamic effect

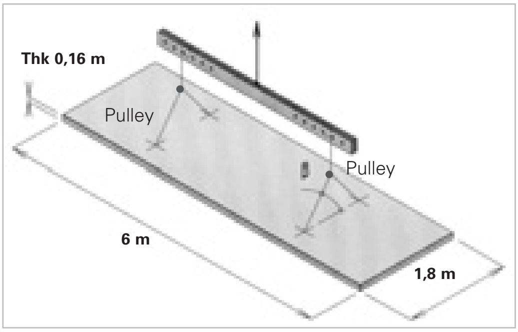
Q_c cable inclination

Q_d lifting method

1. Flat panel 600 x 180 x 16 cm

Assumptions: • flat stripping
• SAFELIFT positioned symmetrically to centre of gravity.

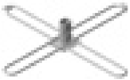
Weight of panel (full concrete):
P = 0,16 x 6,00 x 1,80 x 2500 = 4320 kg
Rc ≥ 300 kg/cm²



- Q_a = 100 kg/m² A_{sc} = 6,00 x 1,80 = 10,80 m²
  $Q_a \times A_{sc}$ = 10,80 x 100 = 1080 kg
- Q_b = 1,15
- Q_c cable inclination: ß = 45°
  cable inclination coefficient: Q_c = 1,41
- Q_d = 1

Stress on each SAFELIFT during stripping: $R = \frac{4320 + 1080}{4} \times 1{,}15 \times 1{,}41 = 2189$ kg = **2,19 ton**

Choice: **SAFELIFT 3 ton - TB - with base**



N.B.: the lifting method coefficient without the use of pulleys is $Q_d = 2$
This would double the stress on each insert and so an SAFELIFT 5 ton TB would be needed.

2. Inverted "T" beam 600 x 70 x 60 cm

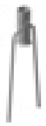
Assumptions: • flat stripping;
• SAFELIFT positioned symmetrically to centre of gravity;
• Since the element is precast with self-acting forms and the full surface is in contact with the form, the adhesion effect (Q_a) is eliminated.

Weight of panel (full concrete):
P = [(0,20 x 0,70) + (0,40 x 0,30)] x 6,00 x 2500 = 3900 kg
Rc ≥ 150 kg/cm²

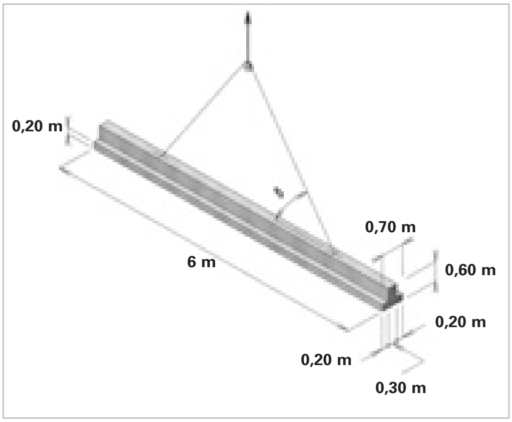
- $\mathbf{Q_a}$ = 0 kg/m²
- $\mathbf{Q_b}$ = 1,15
- $\mathbf{Q_c}$ cable inclination: ß = 45°
  cable inclination coefficient: $\mathbf{Q_c}$ = 1,41
- $\mathbf{Q_d}$ = 1

Stress on each SAFELIFT during stripping:

$$R = \frac{3900}{2} \times 1{,}15 \times 1{,}41 = 3162 \text{ kg} = \mathbf{3{,}2\ ton}$$



Choice: **SAFELIFT 4 ton - TS**



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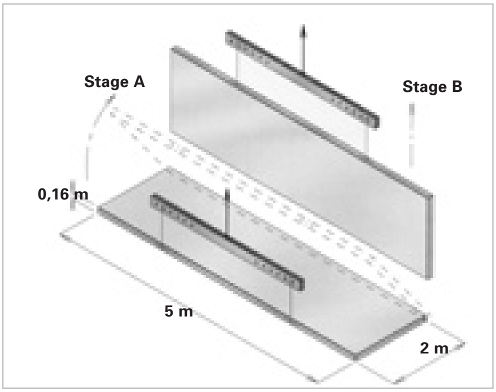
3. Wall panel 500 x 200 x 16 cm

Assumptions: • stripping via edge lifting;
• SAFELIFT positioned symmetrically to centre of gravity.

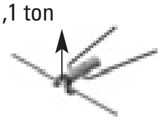
Mean weight of panel = 280 kg/m²
(mean weight calculated by assuming the volumes of polystyrene inside the panel):
P = 5 x 2 x 280 = 2800 kg
Rc ≥ 150 kg/cm²

- $\mathbf{Q_a}$ = 100 kg/m² $\mathbf{A_{sc}}$ = 5,00 x 2,00 = 10 m²
  $\mathbf{Q_a}$ x $\mathbf{A_{SC}}$ = 10 x 100 = 1000 kg
- $\mathbf{Q_b}$ = 1,15
- $\mathbf{Q_c}$ cable inclination: ß = 0°
  cable inclination coefficient: $\mathbf{Q_c}$ = 1
- $\mathbf{Q_d}$ = 0,5 stage A $\mathbf{Q_d}$ = 1 stage B



Stress on each SAFELIFT stage A - edge lifting:

$$R = \frac{2800 + 1000}{2} \times 1{,}15 \times 1 \times 0{,}5 = 1093 \text{ kg} = 1{,}1 \text{ ton}$$



Stage B vertical lift:

$$R = \frac{2800}{2} \times 1{,}15 \times 1 \times 1 = 1610 \text{ kg} = 1{,}61 \text{ ton}$$

Choice: value superior of 2 x A and B: **SAFELIFT 3 ton - TL**

4. Wall panel 800 x 250 x 20 cm

Assumptions : • laying;
• SAFELIFT positioned symmetrically to centre of gravity.

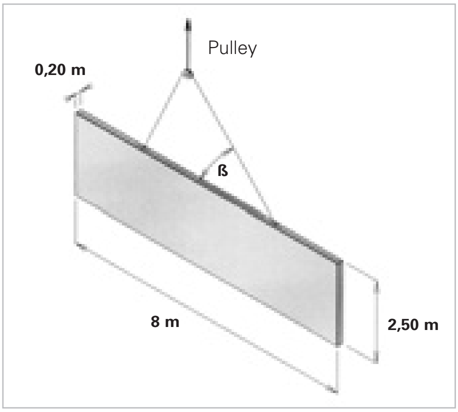
Mean weight of panel = 320 kg/m²
(mean weight calculated by assuming the volumes of polystyrene inside the panel):
P = 8 x 2,5 x 320 = 6400 kg
Rc ≥ 150 kg/cm²

- $\mathbf{Q_a}$ none
- $\mathbf{Q_b}$ = 1,15
- $\mathbf{Q_c}$ cable inclination: ß = 45°
  cable inclination coefficient: $\mathbf{Q_c}$ = 1,41
- $\mathbf{Q_d}$ = 1

Stress on each SAFELIFT during laying:

$$R = \frac{6400}{2} \times 1{,}15 \times 1{,}41 \times 1 = 5188 \text{ kg} = \mathbf{5{,}2\ ton}$$

Choice: **TUBO ANCORA 6 ton - TL**



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5. Wall panel 800 x 250 x 20 cm - Rotating in air

This example shows how to chose the correct SAFELIFT in vertical panels: calculate the load on the P1 and P2 SAFELIFTs during stage B and apply the max cable inclination factor and then enter the actual dynamic effect coefficient.

Assumptions: • SAFELIFT positioned symmetrically to centre of gravity.
• two cranes and correct cable inclination (see page 33)

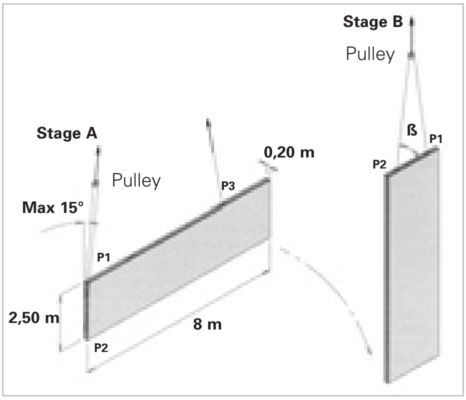
Mean weight of lightened = 320 kg/m²
(mean weight calculated by assuming the volumes of polystyrene inside the panel):
P = 8,00 x 2,50 x 320 = 6400 kg
Rc > 350 kg/cm²

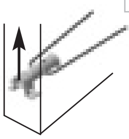
- $\mathbf{Q_a}$ none
- $\mathbf{Q_b}$ = 1,15
- $\mathbf{Q_c}$ cable inclination: ß = 60°
  cable inclination coefficient: $\mathbf{Q_c}$ = 1,16
- $\mathbf{Q_d}$ = 1,30

Stress on each SAFELIFT during rotation in air:

$$R = \frac{6400}{2} \times 1{,}15 \times 1{,}16 \times 1{,}30 = 5550 \text{ kg} = \mathbf{5{,}6\ ton}$$

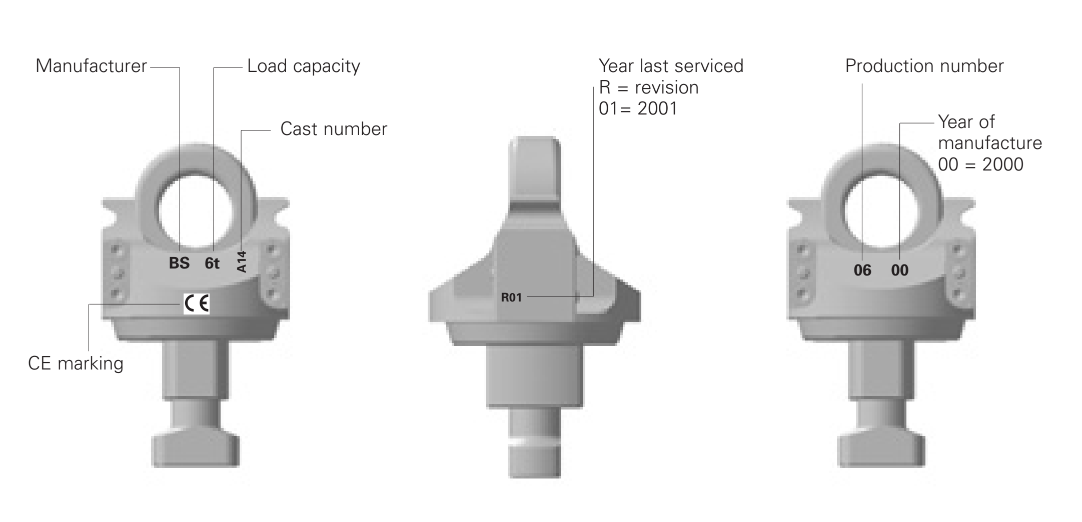
Choice for P1 and P2: **SAFELIFT 6 ton - TL**
To size P3, enter the actual value for the weight of the panel being supported.



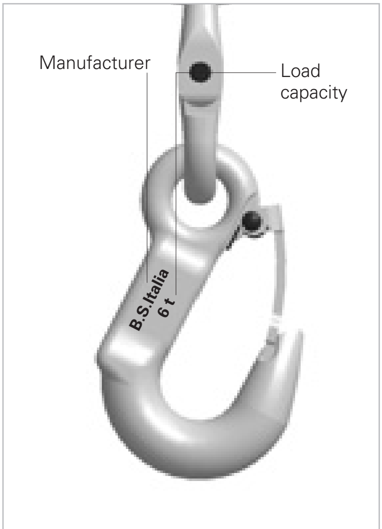


MARKINGS

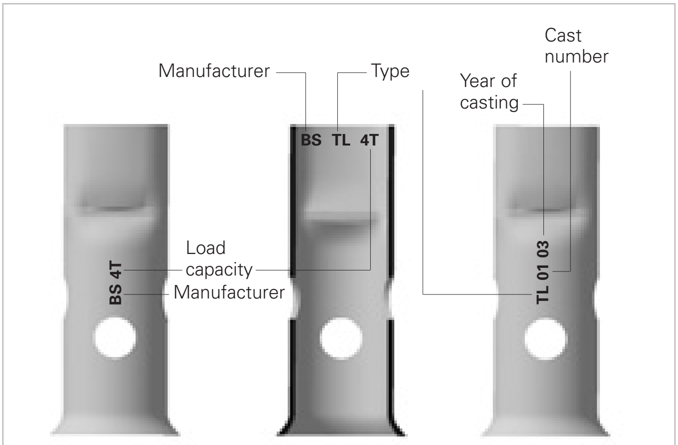
SAFELIFT shackle



Hook



SAFELIFT insert



The markings inside the SAFELIFT can still be seen after casting the concrete.

The markings on the SAFELIFT inserts and shackles are in tons and indicate the SWL (see page 17)
The markings may vary or be in different positions due to changing production needs.

DAMAGED OR WORN PARTS

All lifting equipment, even if correctly used and stored, must be regularly checked and replaced if damaged or worn.
The frequency of such checks depends on the amount of use made of the equipment and the environmental conditions in which it is used or stored. The user shall be responsible for scheduling these checks and replacing any damaged parts.

WELDING OR CHANGES

It is forbidden to weld or make changes to components in the SAFELIFT system that could lessen the load capacity or vary the technical characteristics of the materials and lead to dangerous conditions of work.
B.S.Italia cannot be held liable for any losses of whatever nature arising from changes made to its products or single components.

REPLACEMENT OR INTERCHANGING OF COMPONENTS

All B.S.Italia products are specifically designed to be part of a system for lifting precast/prestressed concrete elements. Replacement parts from other sources must not be used.

DESIGN IMPROVEMENTS

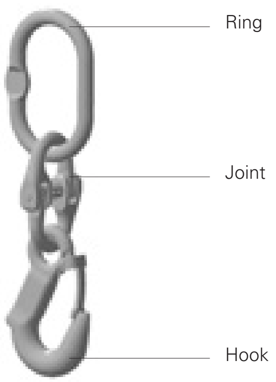
B.S.Italia reserves the right to change the designs of its components and/or accessories and/or capacities at any time without warning.

CALCULATIONS

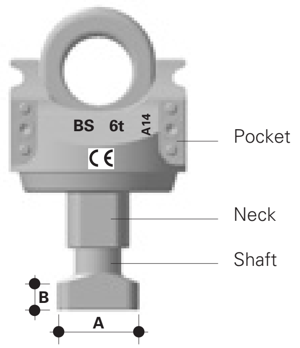
The instructions given in this manual for inserts and confinement must be observed. The concrete element design manager is, however, responsible for choosing the correct SAFELIFT.

A safety manager must be nominated for each project, in full compliance with the law, and he shall be responsible for drawing up a detailed assembly plan. This manual must be kept on site where the system is being used and a copy handed to the relevant managers (production, storage and site).

Articulated hook



Shackle



Dimensions test	
1,5 ton	**3 ton**
A > 19,8 mm **B** > 7,0 mm	> 38,0 mm > 13,0 mm
6 ton	**12 ton**
A > 45,0 mm **B** > 19,0 mm	> 56,5 mm > 23,0 mm

Visual inspection and efficiency test

Carried out on each coupling: visual inspection consists in checking the safety spring on the hook and tightness of the screws; the efficiency test consists in checking the movement of the shaft (translation and rotation) and rotation of the joints.

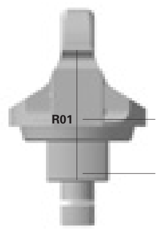
The joint must rotate freely in all directions and be free of built-up dirt, concrete or any other problems that could limit its movement.

Dimensions test

The frequency of this test depends on several factors, such as: amount of use and the environment in which the system is used. The min period of service (c/o B.S.Italia) is 1 year. The user is responsible for requesting annual servicing. The markings on the shackle certify testing by B.S.Italia. Servicing guarantees that the shackle and articulated joint are suitable for safe use. The dimensions test consists in measuring values A and B on the shackle and looking for signs of bending or surface wear on the shaft, neck and pocket of the shackle.

Markings

A new marking is put on the shackle to certify testing and thus renew the 1 year warranty.



Warranty

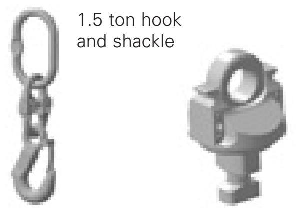
If the shackle fails to comply with the safety standards, it must be replaced.
If the servicing is not carried out by B.S.Italia, any manufacturer warranty is null and void and the user assumes full liability for its use. Welding and changes to the SAFELIFT are not permitted. B.S.Italia cannot be held liable for any losses of whatever nature arising from changes made to its products or components (see page 38).

Replace any pieces damaged by overloading, incorrect use, wear or other factors with a new shackle or hook.

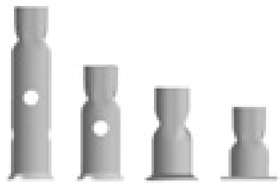
COMPONENT CODES

Load capacity	Description	Code
1,5	Hook for SAFELIFT 1 - 1,5 ton	ANCORA 1.5
1,5	Shackle for SAFELIFT 1 - 1,5 ton	MANIGL 1.5A
1	SAFELIFT standard TS INOX	2601-1.0 I
1	SAFELIFT long TL INOX	2701-1.0 I
1	SAFELIFT base TB INOX	2800-1.0 I
0,5	SAFELIFT TB2	2805-0.5 S
1,5	SAFELIFT standard TS	2605-1.5 S
1,5	SAFELIFT long TL	2705-1.5 S
1,5	SAFELIFT base TB	2800-1.5

1.5 ton hook and shackle



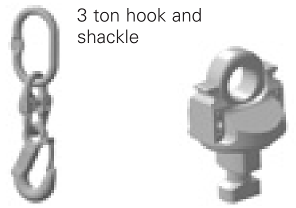
SAFELIFT
1 ton - INOX
1,5 ton



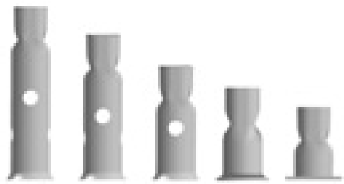
The 1 ton SAFELIFT always has a stainless steel finish.

Load capacity	Description	Code
3	Hook for SAFELIFT 3 ton	ANCORA 3
3	Shackle for SAFELIFT 3 ton	MANIGL 3A
3	SAFELIFT standard TS	2605-3.0 S
3	SAFELIFT medium TM	2655-3.0 S
3	SAFELIFT long TL	2705-3.0 S
3	SAFELIFT TB2	2805-3.0 S
3	SAFELIFT base TB	2800-3.0

3 ton hook and shackle



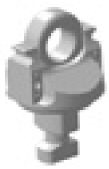
SAFELIFT
3 ton



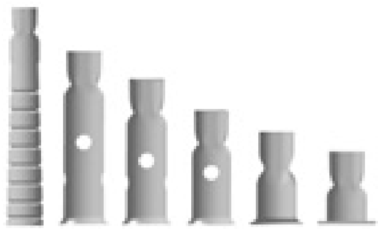
COMPONENT CODES

Load capacity	Description	Code
6	Hook for SAFELIFT 4 - 5 - 6 ton	ANCORA 6
6	Shackle for SAFELIFT 4 - 5 - 6 ton	MANIGL 6O
4	SAFELIFT standard TS	2605-4.0 S
4	SAFELIFT medium TM	2655-4.0 S
4	SAFELIFT long TL	2705-4.0 S
4	SAFELIFT TB2	2805-4.0 S
4	SAFELIFT base TB	2800-4.0
5	SAFELIFT standard TS	2605-5.0 S
5	SAFELIFT medium TM	2655-5.0 S
5	SAFELIFT long TL	2705-5.0 S
5	SAFELIFT TB2	2805-5.0 S
5	SAFELIFT base TB	2800-5.0
6	SAFELIFT standard TS	2605-6.0 S
6	SAFELIFT medium TM	2655-6.0 S
6	SAFELIFT long TL	2705-6.0 S
6	SAFELIFT TB2	2805-6.0 S
6	SAFELIFT base TB	2800-6.0
6	SAFELIFT double T - TT (L 430 mm)	2500-6.0 N
6	SAFELIFT double T - TT (L 330 mm)	2500-6.0 M
6	SAFELIFT double T - TT (L 260 mm)	2500-6.0 S

6 ton hook
and shackle



SAFELIFT
4 ton
5 ton
6 ton

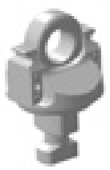


The SAFELIFT can be supplied with different finishes: black (N), electro galvanised (F) or stainless steel (I).
N.B.: stainless steel (I) 6 ton on request.

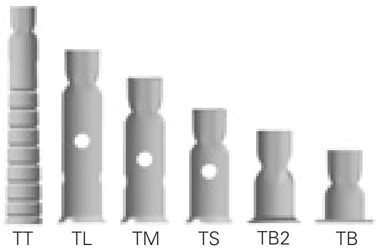
Component codes

Load capacity	Description	Code
12	Hook for SAFELIFT 8 - 10 - 12 ton	ANCORA 12
12	Shackle for SAFELIFT 8 - 10 - 12 ton	MANIGL 12O
8	SAFELIFT standard TS	2605-8.0 S
8	SAFELIFT medium TM	2655-8.0 S
8	SAFELIFT long TL	2705-8.0 S
8	SAFELIFT TB2	2805-8.0 S
8	SAFELIFT base TB	2800-8.0
10	SAFELIFT standard TS	2605-10. S
10	SAFELIFT medium TM	2655-10. S
10	SAFELIFT long TL	2705-10. S
10	SAFELIFT TB2	2805-10. S
10	SAFELIFT base TB	2800-10.
10	SAFELIFT double T - TT (L 430 mm)	2500-10. L
10	SAFELIFT double T - TT (L 350 mm)	2500-10. N
10	SAFELIFT double T - TT (L 280 mm)	2500-10. S
12	SAFELIFT standard TS	2605-12. S
12	SAFELIFT medium TM	2655-12. S
12	SAFELIFT long TL	2705-12. S
12	SAFELIFT TB2	2805-12. S
12	SAFELIFT base TB	2800-12.

12 ton hook
and shackle

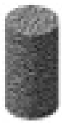


SAFELIFT
8 ton
10 ton
12 ton

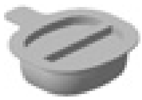


The SAFELIFT can be supplied with different finishes: black (N), electro galvanised (F) or stainless steel (I).
N.B.: stainless steel (I) 6 ton on request.

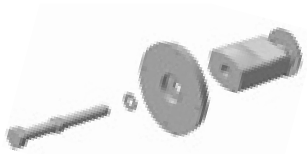
Description	Code
Shear tie	
1 - 1,5 ton	3502-1.5
2,5 - 3 ton	3502-3.0
4 ton	3502-4.0
5 - 6 ton	3502-6.0
8 ton	3502-8.0
10 ton	3502-10.
12 ton	3502-12.



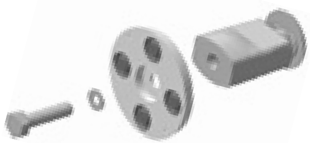
Description	Code
Foam plug	
1 - 1,5 ton	Polirex 23.5
2,5 - 3 ton	Polirex 42
4 - 6 ton	Polirex 50
8 - 10 - 12 ton	Polirex 61.5



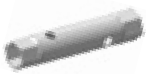
Description	Code
Plastic cap	
1 ton	TABTUBO-1
1,5 ton	TABTUBO-1.5
2,5 - 3 ton	TABTUBO-3
4 - 5 ton	TABTUBO-4
6 ton	TABTUBO-6
8 ton	TABTUBO-8
10 ton	TABTUBO-10.
12 ton	TABTUBO-12.



Description	Code
Fixing set for wooden forms with spacer	
1 - 1,5 ton	2954-1.5 F
2,5 - 3 ton	2954-3.0 F
4 - 6 ton	2954-6.0 F
8 ton	2954-8.0 F
10 ton	2954-10 F
12 ton	2954-12 F



Description	Code
Fixing set for steel forms with magnetic spacer	
1 - 1,5 ton	2955-1.5 F
2,5 - 3 ton	2955-3.0 F
4 - 6 ton	2955-6.0 F
8 ton	2955-8.0 F
10 ton	2955-10 F
12 ton	2955-12 F



Description	Code
Tightening tool	
1 - 1,5 ton	2962-1.5 N
2,5 - 12 ton	2962-12.N

Description	Code
Extraction lever	
2,5 - 12 ton	2965-12.F

The shear tie can be supplied with different finishes: black (N), cold galvanised (F). N.B.: stainless steel (I) 6 ton on request.

B.S.Italia®
Styl-Comp Group
innovazione basata sull'esperienza
innovation based on experience

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