Good to know about handling and use of Wire rope, Lifting gear and Lashings

Technical information

Safe use and purpose of steel wire ropes

Designated use:
Crane ropes for lifting of loads in accordance with their technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions for first use, operation, maintenance and testing.
Any other use, especially exceeding the specified lifting capacity and operation or assembly by untrained persons is deemed improper.

Selection
Selection of running wire ropes. The selected wire rope must be strong enough. Applicable directives, standards and regulations must be observed. Certex recommends selection in accordance with ISO 4308-1 "Cranes and Lifting appliances – Selection of wire rope" f or cranes built prior to 2013. Post 2013 the standard was replaced by ISO 16625 "Cranes and hoists -- Selection of wire ropes, drums and sheaves". Other, local regulations and manufacturers' information may also need to be taken into account. Apart from the strength of ropes, various wire rope types and designs have different properties which offer many additional criteria for selection. The selection of a wire rope implies examining the positive and negative properties of the different designs for each application in order to find the most suitable rope. A specialist may find a discarded wire rope very useful in this respect. We will gladly assist you in finding the optimal rope for your application.

The following information is not binding and does not substitute the applicable standards, directives and regulations.

Strength
A rope selection factor (C) must be found to select a rope of adequate strength pursuant to ISO 4308-1 for a specific purpose within a group of mechanisms.

$C = \sqrt{Zp/K'} \times Ro$

C = Rope selection factor
K' = Minimum breaking load factor (see ISO 2408)
Ro = Minimum tensile strength of the wire used in the rope
Zp = Minimum coefficient of utilisation (see table)

Minimum coefficient of utillisation (Zp)

Mechanism group	M1	M2	M3	M4	M5	M6	M7	M8
Zp cable drives	3.15	3.35	3.55	4.00	4.50	5.60	7.10	9.00
Zp Pendant and stay ropes	2.50	2.50	3.00	3.50	4.00	4.50	5.00	5.00

Mechanism group and minimum coefficient of utilisation ZP Values for mobile cranes acc. to ISO 4308-2 on request

Minimum breaking load factor (K')
The minimum breaking load factor for different rope constructions is given in BS EN 12385-4.
K' may also be calculated as follows:

K' = Minimum breaking load factor
f = Fill factor
k = Stranding loss factor
$K' = fnxk/4$

The table below gives K' values for different rope designs. Depending on the mechanism group, the nominal strength of the wire (1960 N/mm² in this case) and the rope tension, this may be used to determine the minimum wire rope diameter of the specific rope design.

Rope type	Fill factor	Stranding factor	Min. breaking load factor
	F	k	K'
Verostar	0.620	0.860	0.419
Veropro 8	0.670	0.850	0.447
Veropower 6	0.720	0.850	0.481
Veropower 8	0.750	0.870	0.512
Stratoplast	0.617	0.860	0.417
Turboplast	0.665	0.850	0.444
Stratolift	0.661	0.860	0.446
Turbolift	0.734	0.830	0.478

The above data are for information only.

Rope type	Fill factor	Stranding factor	Min. breaking load factor
	F	k	K'
CTE	0.620	0.751	0.366
6x36 IWRC	0.580	0.782	0.356
6x36FC	0.500	0.840	0.330
8x19S IWRC	0.574	0.751	0.356

The above data are for information only. Contact your CERTEX branch for detailed information

Minimum rope diameter
Finding the minimum rope diameter in acc. with ISO 4308-1

d min = CVS

d min = Minimum rope diameter
C = Rope selection factor
S = Max. rope tension, in Newtons

Minimum breaking load
Acc. to ISO4308-1

F min = SxZp

S = Max. rope tension in Newtons
Zp = Minimum coefficient of utilisation acc. to table

Design
In addition to the strength, the selected wire rope must also be suited to the specific application. Different rope designs have very divergent properties.

Never replace one rope design with another without expert advice.

Special conditions of use
Provide as much information as possible when ordering wire ropes. Fundamental information is given in the crane book. Further data on issues such as working temperature, use in aggressive media etc. are of paramount importance for selection and safe operation of your wire ropes and equipment.

Temperatures
Wire ropes with fibre cores and/or aluminium mechanical splices must not be used where working temperatures exceed 100 degrees Celsius. Wire ropes can be used down to - 60ºC.

Never use wire ropes in temperatures above 400°C.

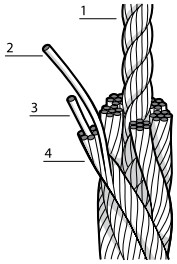
Working temperature	100-200 °C	200-300 °C	300-400 °C	+ 400 °C
Reduction in lifting capacity	10%	25%	35%	100%
		35%		
		100%		

Rope elements

Wire ropes consist of single wires twisted to form strands. These strands are then twisted about a rope core. The dimensions of the single wires, their position, number, form and design of the rope core determine the main properties of a wire rope design.

1. Rope core
2. Wire
3. Strand core
4. Strand

Steel wire rope

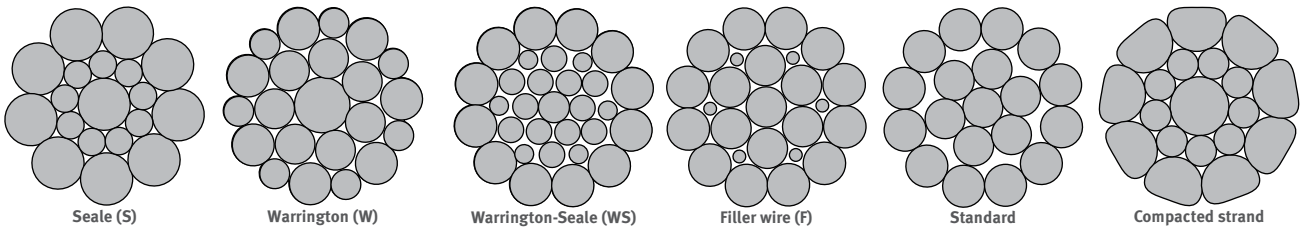


Rope core

Rope cores are at the centre of the rope and significantly affect its properties. Steel cores and plastic sheathed cores normally enhance the stability of the wire rope. By selecting a suitable rope core, damage caused by high radial forces such as those occurring during multilayer coiling may be counteracted.

Strand construction

Strands consist of one or more layers of rope wires twisted around a core. This core may comprise one or more wires, but also fibres. The design of the strand significantly affects the physical properties of the completed rope.



Rope construction

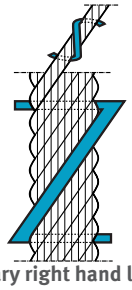
The rope core and the strands are twisted to form the finished wire rope. Wire ropes comprise single and multilayer round strand ropes. Single layer round strand ropes usually have 6 or 8 strands.

Multilayer wire rope designs would normally be rotation-resistant or "rotation-free", for example 19x7 or 35x7.

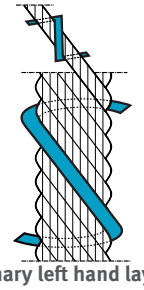
The multilayer structure of this rope design allows manufacture of ropes with a very low twisting moment across a certain range of loads since the twisting forces in different layers are mutually opposing.

Type and direction of lay

The suitable lay type and direction depends on the cable drive design. Right-hand and left-hand lay ropes are often used in a system to cancel out the twisting effect of two single layer rope constructions. Only ropes with the same lay type and direction should be combined in a cable drive. The following lay types and directions are common:

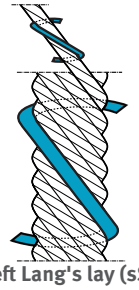


Ordinary right hand lay (sZ)



Ordinary left hand lay (zS)

Right Lang's lay (zZ)

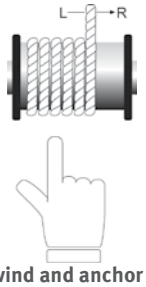


Left Lang's lay (sS)

Small letters designate the lay of a single wire in the strand.
Capital letters designate the lay of the strand.

Selecting the appropriate direction of lay

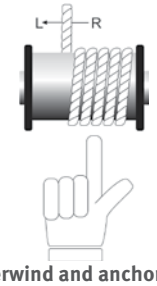
Rope runs over the top of the rope drum.



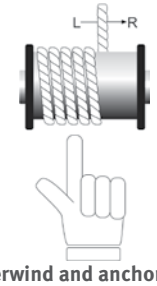
Overwind and anchor point
left = right hand lay rope

Overwind and anchor point
right = left hand lay rope

Rope runs over the bottom of the drum.



Underwind and anchor point
left = right hand lay rope



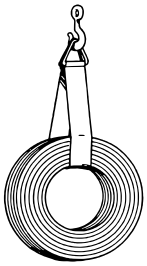
Underwind and anchor point
right = left hand lay rope

Storage and transport of wire ropes

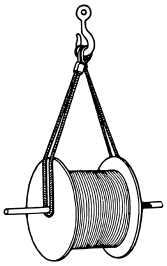
Ropes must be stored in a clean, well-ventilated, dry and protected area.
Wire ropes must be stored at room temperature. In case of longer storage, the rope must be checked regularly for corrosion and protected through appropriate re-lubrication, if necessary.

The rope must be protected against mechanical damage during storage and transport. Avoid incorrect transport.

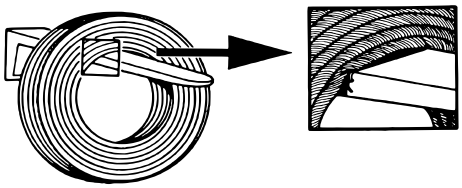
Mark wire ropes permanently and uniquely, to avoid confusion.



Right



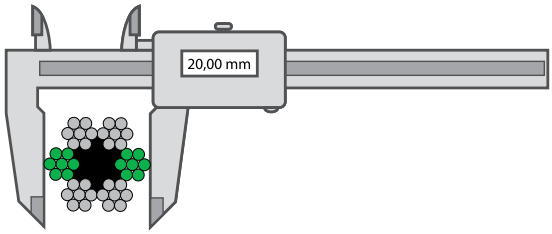
Right



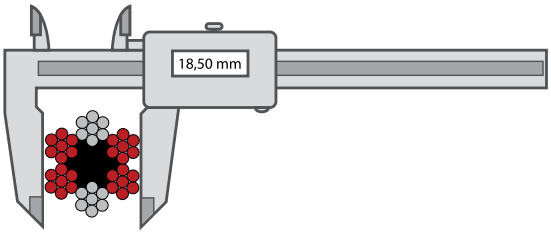
Wrong
Forklift forks often damage ropes!

Measuring wire ropes

Check the rope diameter (see diagram) and the rope terminations for visible defects before putting the wire ropes into use. Check all the technical data in the markings and the corresponding certificates.



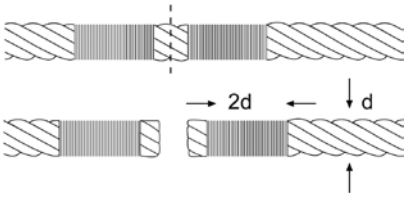
Right



Wrong

Cutting wire ropes to length

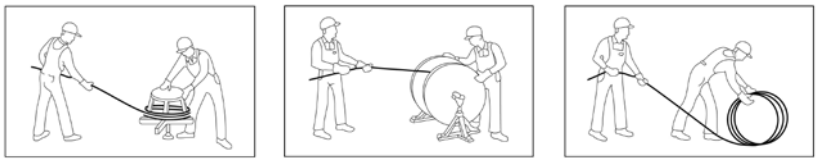
Before cutting, steel wire ropes must be prevented from untwisting (see sketch). At least 2 seizings must be applied on both sides of the cut in case of multilayer wire ropes or parallel twisted ropes:



We recommend using a cut-off grinder for cutting. Please strictly observe the relevant safety regulations. Wear protective gear!

Unreeling wire ropes

Avoid damaging or twisting the wire rope when unreeling

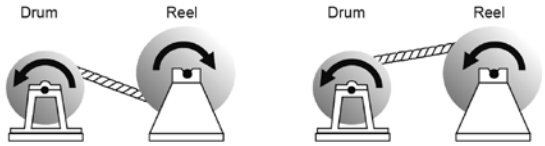


Correct handling of wire ropes will extend their service life. We recommend the use of split grips/pulling eyes with a flexible connection to prevent torsion in the old rope from being transferred to the new rope. Ensure safe and firm connections!

Rope installation

Reverse bending must be avoided when the wire rope is spooled from the delivery reel. The ropes must be adequately pre-tensioned when winding onto the rope drum to ensure proper reeling and safe operation of the cable drive.
Only qualified persons may install the wire ropes. Proper assembly and perfect condition of the wire ropes must be checked before re-starting.

New wire ropes must be run in at small partial loads.



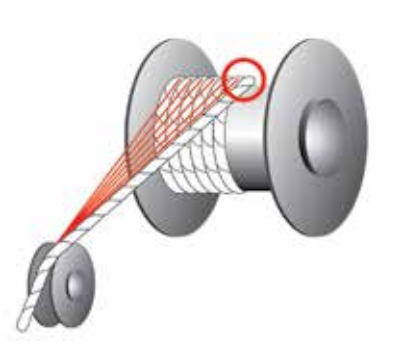
Fleet angle

Fleet angles may cause increased wear or strain on wire ropes. With coiling onto a smooth drum, the fleet angle should be 0.5 to 2.5 degrees. If the rope is damaged by adjacent windings, the service life may be improved by using compacted or lang lay ropes.

The fleet angle on drums should likewise not exceed 2.5 degrees.
With multilayer or parallel twisted rope constructions, the angle should not exceed 1.5 degrees.

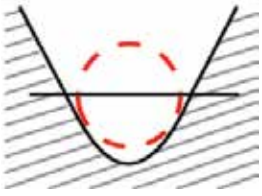
Ensure that the running wire rope cannot run off the flange of the sheave or drum.

The points where the rope enters the equipment at a fleet angle need special attention in the course of monitoring the wire ropes in use.



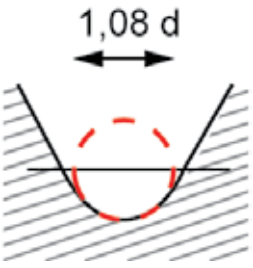
Drum grooves

The design and condition of the drum grooves in rope sheaves or on rope drums are decisive criteria governing the rope's service life

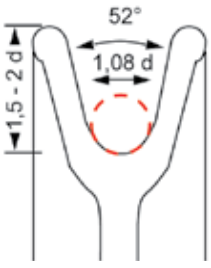


Sheave groove too nar-rowwires and strands in the rope deformed, which means short life of the rope.

Sheave groove too wider-ope has bad support, risk for deform of the rope and damages in the groove profile.



Sheave groove correctthe rope has maximal contact surface.

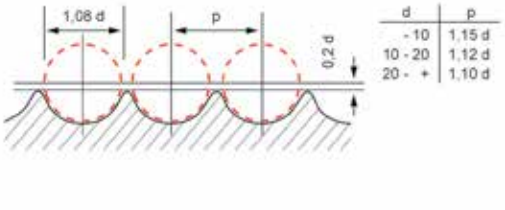


Groove_profile

Wire rope sheaves

Rope sheaves should support the rope along approx. 1/3 of its circumference.

Certex recommends a groove diameter of 1.08 x d
(d = nominal rope diameter).



Rope drums

The dimensions and design of grooves on drums for single layer windings.

Check the condition of the drum grooves and the mobility of all rope sheaves before every rope change.

Hardness of steel wires and rope sheaves

Nominal strength of the rope wires	Values acc. to API 9 A	Hardness approx.	
N/mm²		Brinell	Rockwell C
2160	EEIPS	480/500	52
1960	EIPS	470/480	51
1770	IPS	445/470	49
1570	PS	405/425	45

Recommended hardness of drum grooves made of alloyed or Mn steel = 250 to 300 Brinell

Wire rope sheaves and drum diameter

We recommend calculation of the required rope and drum diameters based on the establishment of the minimum rope diameter as described above.

$D_1 \geq xh_1 \times txd_{min}$
$D_2 \geq xh_2 \times txd_{min}$

D_1 = Min. drum diameter
D_2 = Min. rope sheave diameter
dmin = Minimum rope diameter
h1 = Selection factor acc. to Table
h2 = Selection factor acc. to Table
t = Rope factor acc. to Table

Mechanism group	Drum factor h1	Rope sheave factor h2
M1	11.20	12.50
M2	12.50	14.00
M3	14.00	16.00
M4	16.00	18.00
M5	18.00	20.00
M6	20.00	22.40
M7	22.40	25.00
M8	25.00	28.00

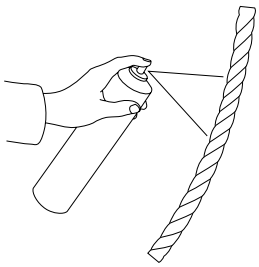
No. of outer strands in the rope	Rope factor t
3 to 6	1.25
6 to 10	1.00
8-10 with plastic sheathed core	0.95
10 and more outer strands*	1.00

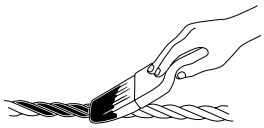
** twist-resistant rope construction*

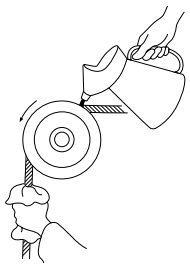
Lubrication of wire ropes

Running wire ropes must be lubricated regularly when in operation. Regular treatment with suitable lubricants may significantly increase rope service life.

Contact CERTEX for further advice and help on lubrication.







Discard condition of wire ropes (where applicable, local guidelines should also be consulted in addition to these notes)

Corrosion

Wire rope corrosion may be counteracted by galvanising, lubricating or by selecting a rope construction with large wire diameters.

Wear

Contact between the rope and other elements of the cable drive abrades the individual wires. Contact between individual wires inside the rope likewise causes internal abrasion in the rope. This abrasion reduces rope strength and ultimately leads to its scrapping. Selection of an appropriate rope construction may be decisive in increasing rope service life.

Example:
A 22 mm wire rope of rope construction 6 x 36 WS has 14 outer wires per strand, each measuring 1.28 mm in diameter. The outer wires of a rope with the same rope construction diameter of 6 x 19 S each measure 1.83 mm in diameter, thereby significantly improving on the abrasion properties.

Diameter changes

Single layer round strand wire ropes having a diameter reduced by more than 10% should be discarded.
Rotation-free / rotation-resistant wire ropes with a diameter reduced by more than 3% should be discarded.

Damaged wire ropes

Wire ropes with deformations or changes in the rope structure must be discarded.
Wire ropes with damaged strands or wire deformations must be discarded.
Bird caging, tangled loops, protruding rope cores or other visible damage due, for instance, to heat, are likewise reasons for scrapping.

Wire ropes with damaged rope terminations must be discarded.

Wire breakage

Wire ropes exhibiting individual wire breakages exceeding the max. permissible number as per Tables 1 and 2 must be discarded. Refer to ISO 4309 or the wire rope manufacturer's documentation for further information.

Maximum permissible number of visible wire breakages for single layer and double-parallel twisted wire ropes in cable drives with steel rope sheaves.

Table 1

		No. of visible wire breakages [b]		No. of visible wire breakages [b]		For rope sections in	
		Ordinary lay ropes in M1-M4 or unknown [d]		Lang lay ropes in all mechanism classes		multilayer coiling [c]	
RCN Code	No. of load-bearing wires in the outer strands [a] (n)	On a length6 x d [e]	On a length30 x d [e]	On a length6 x d [e]	On a length30 x d [e]	On a length6 x d [e]	On a length30 x d [e]
01	n < 50	2	4	1	2	4	8
02	51 - 75	3	6	2	3	6	12
03	76 - 100	4	8	2	4	8	16
04	101 - 120	5	10	2	5	10	20
05	121 - 140	6	11	3	6	12	22
06	141 - 160	6	13	3	6	12	26
07	161 - 180	7	14	4	7	14	28
08	181 - 200	8	16	4	8	16	32
09	201 - 220	9	18	4	9	18	36
10	221 - 240	10	19	5	10	20	38
11	241 - 260	10	21	5	10	20	42
12	261 - 280	11	22	6	11	22	44
13	281 - 300	12	24	6	12	24	48
	> 300	0.04n	0.08n	0.02n	0.04n	0.08n	0.16n

a) Filler wires do not count as load-bearing wires.
b) A broken wire has 2 ends.
c) This value is applicable to areas possibly damaged by fleet angles and ropes touching on multilayer rope drums.
d) Double the given number of wire breakages is applicable to Group M5 to M8 cranes.
e) d = Nominal wire rope diameter.

Number of max. permissible, visible wire breakages for rotation-resistant or rotation-free wire ropes in cable drives with steel rope sheaves.

Table 2

RCN Code	Rope construction or no. of load-bearing* wires in the outer strands [a](n)	No. of visible wire breakages [b]		No. of visible wire breakages [b]	
		On a length 6 x d[d]	On a length 30 x d[d]	On a length 6 x d[d]	On a length 30 x d[d]
21	4-strand rope or n < 100	2	4	2	4
	3- or 4-strand ropes n > 100	2	4	4	8
	11 or more outer strands				
23-1	76 - 100	2	4	4	8
23-2	101 - 120	2	4	5	10
23-3	121 - 140	2	4	6	11
24	141 - 160	3	6	6	13
25	161 - 180	4	7	7	14
26	181 - 200	4	8	8	16
27	201 - 220	4	9	9	18
28	221 - 240	5	10	10	19
29	241 - 260	5	10	10	21
30	261 - 280	6	11	11	22
31	281 - 300	6	12	12	24
	n > 300	6	12	12	24

a) Filler wires do not count as load-bearing wires.
b) A broken wire has 2 ends.
c) This value is applicable to areas possibly damaged by fleet angles and ropes touching on multilayer rope drums.
d) d = Nominal wire rope diameter.

Special constructions with larger outer wire diameters deviating from the standard might be classified deviating from Table 1. Contact the manufacturer in this regard. For Seale-type wire ropes, where the number of outer wires in strands does not exceed 19, the rope should be classified two rows above the actually applicable row in Table 1.

The number of wire breakages may be applicable (to the most-stressed rope section) in the case of steel grooves or plastic drum grooves and multilayer coiling but they are not applicable to plastic drum grooves and single layer coiling.
Interior damage and concealed interior wire breakages deserve special consideration in this case.

Typical steel wire rope damage

Typical steel wire rope damage
Discard the wire rope in accordance with current regulations or according to the manufacturers recommendations.

Only a qualified and experienced person should be responsible for discard.

The pictures show typical examples of wire rope deterioration.

⚠ Failure to take adequate precautions could result in injury.

Mechanical damage caused by contact of the running rope with a sharp edge

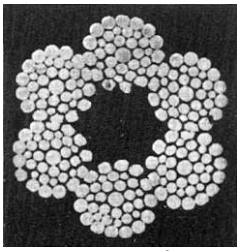
Local abrasion due to contact with the crane structure

Parallel wear pattern in the cyclical bending area, ending in wire breakage. Caused by grooves in rope sheaves that are too small or too big.

Two parallel rows of wire breakages caused by too small grooves in the rope sheaves.

Strong abrasion due to excessive pressure between rope and rope sheave.

Heavy abrasion on Langs lay ropes



Heavy corrosion

Wire breakages after exceeding the maximum number of bending cycles

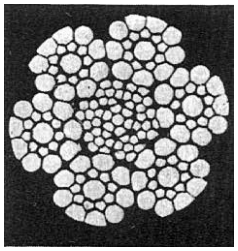
Wire damage due to strand contact

Destruction of the rope core through extreme stress.

Loosening of individual wires caused by shock loading or twisting

Local abrasion and deformation

Bird caging after shock load or twisting of multi-layer round strand ropes



Corrosion of the rope core, the surface of the outer rope wires remains largely undamaged.

Operating instructions for Load Lifting Attachment/s (LLA/s)

General notes on all LLAs

1. Read these operating instructions carefully and ensure that the information is accessible to all persons authorised to operate LLAs.

2. Certex LLAs may be used exclusively as designated in these operating instructions. Improper use may be hazardous and cause damage. These instructions must be deemed recommendations insofar as they are not directly applicable to a supplied LLA.

3. For use only by assigned and instructed persons and in compliance with the applicable regulations pursuant to The Lifting Operations and Lifting Equipment Regulations (LOLER) and BS EN 13155.

4. The LLA must be meticulously checked visually for damages, completeness, wear and tear, tight fit of all moving parts and functional safety every time before first use. Hard to move components are a sign of overloading. If full usability of an LLA is in doubt, it must be removed from service immediately to be checked by an competent person.

5. Never exceed the maximum lifting capacity of the LLA. No persons may be present in the danger zone near a load.

6. LLAs are not certified for transporting persons (exception: manbaskets). LLAs without name plates or with illegible lifting capacity specification may not be used. Transporting of fluids or bulk goods, use outside the temperature range of – 20°C to + 100°C and exposure to chemicals such as acids, lyes and vapours is prohibited.

7. Rig only symmetrical loads. The centre of gravity of the load must be positioned precisely under the crane hook and the hitching points precisely below the load lifting points of the LLA. Ensure that the load is distributed equally for LLAs with several load lifting points. Maximum permissible deviation from horizontal is 6°. Never use LLAs for pulling loads (e.g. off a truck or from storage).

8. Ensure that hitching points and rigging are dimensioned to take the weight of the load and direction of pull. Observe permissible spread angles. Preferably rig as “direct” or “choker”. With “basket” type rigging, the load might slip out. Lash loads, if necessary.

9. Ensure that the safety latches of all load carrying apparatus are closed. The suspension eye of the load lifting attachment must have sufficient space in the crane hook to move freely. Hooks may not be loaded at their tip. A shortening hook must be used with oversized crane hooks.

10. Pulling other than vertical with the LLA is prohibited, do not tear loads away, do not pull against a resistance, prevent loads from toppling when turning them. Ensure that the load does not swing and knock against objects when moving the LLA. Accelerate and slow down gently - no sudden lifting or shifting. Max. lifting rate: 10 m/min. ‘

11. Be careful when operating and moving the LLA. Use the handles; keep your hands away from moving parts (especially from the scissor mechanism of the grippers). To prevent crushing and abrasion, create adequate clearance to move the load. When setting down the load, make sure that it cannot topple, slip or roll away. Do not leave the load unattended or suspended for longer than necessary.

12. Avoid strained body postures. Stand as upright as possible, remove obstacles and protect yourself by wearing a helmet, safety goggles, gloves etc. Talk to us if you must adopt an ergonomically unfavourable posture to operate the LLA.

13. Store LLAs in a stable manner when not in use. They must not topple with a 10° angle of inclination in any direction. Secure suspension racks or storage trestles or racks, manufactured if necessary, are suitable options. We would gladly provide you with a quotation in this respect. Do not store the LLA in very moist, salty, corrosive, alkaline or explosive atmospheres.

14. All load lifting machines ready for commissioning on delivery were subjected to a static load test prior to delivery:
Manually operated load lifting machines were tested at 1.5 times their lifting capacity.
Powered load lifting machines were tested at 1.25 times their lifting capacity.

Certex load lifting attachments falling under the Machinery Directive are designed to pass a static test at 2 times their rated lifting capacity.

Notes on maintenance and testing
LLA design in acc. with EN 13155 (max. 20 000 load cycles under full load)

Examination before first operation
CERTEX LLAs have passed final inspection in the factory, were tested and are ready for use. Examination before first operation is required under UK regulations by a competent person at the operating company before first use and any defects must be remedied.

Regular inspections
LLAs must be checked by an competent person at least once a year and also after special incidents such as overloading or damage and after repair. Accessories must be tested for compliance with the applicable regulations.
Attention: Shorter inspection intervals or different lifting capacity ratings may be necessary in case of highly dynamic loads or frequent use. LLAs must be monitored for visible defects when in use. The operator is responsible for requesting inspections.

Inspections prior to every use
Check the exterior condition of the LLA for deformation, heavy corrosion and other wear and tear. All moving parts such as hooks, bolts, shackles, screw connections, splints, springs, shafts, sheaves, force transfers and the like must be checked for mechanical damage, deformation, missing or faulty safety devices and for cross section reductions of 5% or more. Check that the nameplate is fitted and legible.

Repairs
CERTEX LLAs may only be checked and repaired by specialists. Heat treatment and welding is not permitted. A load lifting test must be performed at nominal load after any repairs. Certex (UK) accepts no liability for damages arising from conversions and modifications of its supplied apparatus and from the use of non-original parts.

Non-observance of the above may void any claims against Certex (UK) under product liability or warranties.

Please also observe the component-specific notes on the different LLA groups!

Component-specific notes on the different LLA groups

Rigid and adjustable lifting beams

Designated use
Detachable load lifting apparatus for lifting and horizontal transport of loads in accordance with its technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions governing first use, operation, maintenance and testing. Any other use, especially lifting of persons, lifting of loads over persons, exceeding the specified lifting capacity and operation by untrained staff is deemed improper.

Lifting beams are beams loaded in bending with usually a central suspension arrangement for the crane hook (on the crane side) and two or more suspension points for load attachment (on the load side). They serve to distribute forces from the hook of the crane to the load suspension points, to prevent buckling forces and to protect lifted loads. With symmetrical rigging to two load lifting points, each point carries 50% of the load. If the suspension points are adjustable, they can be arranged such that the crane hook suspension point is not at the geometric centre but rather above an asymmetric centre of gravity of a load. Ensure in this case that the suspension points closest to the crane hook (and therefore also the attached slings) carry more load than those further away. A torsion-free design is necessary for H lifting beams with asymmetric loads! Please consult the manufacturer.
Use only the load lifting points provided. Any oblique tension on the load side is prohibited. The spacing between the suspension points of adjustable lifting beams may not be changed during lifting.
The permissible load per suspension point must be observed in the case of several suspension points (e.g. on lifting beams for transporting flexible rods). These lifting beams are normally unable to carry all of the load just on the outer load lifting points. Refer to the data sheet or the drawing for permissible loads per suspension point.

With **lifting beams with a suspension assembly that can be shortened** (using chain shorteners, for instance), the slings can be arranged such that the crane hook eye is positioned off the geometric centre and thus above a centre of gravity of the load which is asymmetrical. Ensure in this case that the suspension points closest to the crane hook (and therefore also the attached slings) carry more load than those further away.

Spreader beams and spreader frames are stressed mainly in compression, not bending, and they are therefore designed for static loads. It is strictly prohibited to fit additional suspension points to the beam or to use load lifting points other than those provided.

With adjustable lifting beam suspension, ensure that the max. permissible slinging angle is not exceeded, even at maximum working length. It is therefore prohibited to bore additional holes to change the adjustment range or to shorten the suspension slings (for a lower clear height, for instance).

Low profile lifting beams or lifting beams with adjustable crane hook suspension points may hang on the crane hook highly unstable and/or skew when not under load. This requires particularly alert crane operators.

Lifting beams for forklifts extend the range of applications for forklifts and may change the basic balance conditions. You should therefore check if the forklift is suited for the transport required before use.

The LLA must be **secured against slipping off** again after the forklift forks have engaged in the pockets on the LLA. This is normally achieved using a chain which is wrapped around the mast and which can be shortened to fit tightly, or using locking levers pressing against the forklift forks. Ensure, in this case, that the pin presses fully against the fork and tighten the locking handle.

Position the LLA above the centre of gravity of the load and rig using suitable slings. Lift carefully and check level suspension.

Always drive slowly when moving loads with the forklift! Bear in mind the balancing conditions and the forces arising when braking and negotiating uneven floors.

Observe the load diagram of the forklift.

Never exceed the individual lifting capacity of the suspension points!
Lifting beams may only be used with vertically hanging slings!

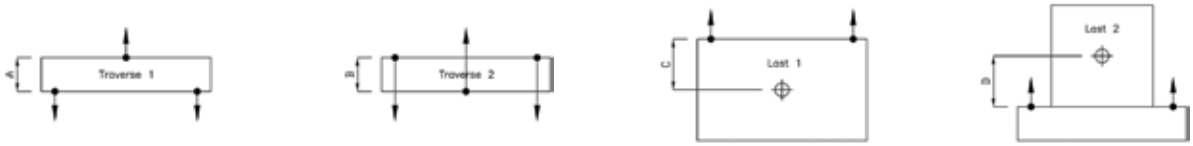
Stability height of load lifting attachments and load

Be particularly cautious if the centre of gravity of the load lies higher than the load hitching point:

The load lifting attachment has a “rigid height”. This is the dimension from the seat on the crane hook to the next pivoting point above or below (e.g. the shackle bolt for attaching the load). The load similarly has such a rigid height. This is the distance between the suspension point of the sling to the centre of gravity of the load. The stability height of the combination lifting beam and load must be positive.

Lifting beam 1 has a positive stability height, lifting beam 2 has a negative stability height.
Load 1 has a positive stability height, load 2 has a negative stability height.
Although only the two-dimensional case is shown, the principle may be applied to all horizontal axes of rotation. The result of the combinations is as follows:

Lifting beam 1 + Load 1: is always stable.
Lifting beam 1 + Load 2: is stable if A>D.
Lifting beam 2 + Load 1: is stable if C>B.
Lifting beam 2 + Load 2: is always unstable.



Coil hooks

Detachable load lifting apparatus for lifting and horizontal transport of loads in accordance with its technical specifications and conditions of use. This also includes compliance with the manufacturer’s instructions governing first use, operation, maintenance and testing. Any other use, especially lifting of persons, lifting of loads over persons, exceeding the specified lifting capacity and operation by untrained staff is deemed improper.

Coil hooks are permitted only to transport objects with their centre of gravity below the supporting fork during transport. They are available with or without counterweight, with or without safety nose and with a full or ¾ tine.

A **counterweight** facilitates horizontal orientation of the **empty** hook to facilitate its positioning. Preferably use **coil hooks without counterweights** only for low lifting capacities and short tine lengths, since these LLAs are light-weight and can easily be balanced by hand. A safety nose prevents the load from slipping in case of improper use or if the load starts swinging. Certex recommends using safety noses. Not using a safety nose should be considered only under special circumstances.
3/4 tines are used in confined spaces or if highly diverse coil widths are to be transported with the same coil hook. Ensure in this case that the tine length is at least 0.75 times the coil width. Coil hooks with ¾ tines are designed without a safety nose.
The centre of gravity of the load must always lie below the crane hook attachment point, offset slightly towards the back of the hook. This ensures that the tip of the coil hook tine is tilted slightly upward (at least 5°). This is permissible in order to secure the load.
Transporting coils with the centre of gravity in front of the suspension point (towards the tip of the tine) tips the tine downward and is always prohibited (even with a safety nose).
Transporting coils with the centre of gravity far behind the suspension point (towards the back of the hook) is safe, since the load is supported by the back of the C hook.

Ensure that a tine tip projecting from the coil does not get hooked on other objects.
Narrow, unsecured slit strips pose a hazard since they might topple from the tine in transport. Check in each case whether transporting is permissible. For a solution, a coil hook may be fitted with a load securing device.

Coil tipping devices are suitable for turning coils and slit strips from the vertical to the horizontal coil axis position. The following should be noted in addition when working with a coil tipping device:

- Turning is dangerous and particular caution must be exercised.
- Turning from vertical to horizontal (putting down) is not permitted.
- The width of the coil or strip must be at least half the length of the tine!
- The nose of the tipping hook must remain fully in contact during the entire turning exercise.
- The tipping hook must remain in contact both horizontally and vertically during turning.

Loading forks

Designated use
Detachable load lifting apparatus for lifting and horizontal transport of loads in accordance with its technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions governing first use, operation, maintenance and testing. Any other use, especially lifting of persons, lifting of loads over persons, exceeding the specified lifting capacity and operation by untrained staff is deemed improper.

The **centre of gravity** must be considered in all types of loading forks!
The distance of the centre of gravity of the load to the back of the loading fork must be small enough to allow the fork tips to point **at least 5° upward from horizontal** when under load. Although handling might be complicated if the centre of gravity of the load is located nearer to the back of the loading forks, safety remains assured. The load must rest securely on the forks and be secured against sliding off sideways. Provided the load is secured, the loading fork may also be used with horizontal forks.

Loading forks with a counterweight have a **fixed crane hook attachment.** If possible, the centre of gravity of the load should be positioned below this suspension point and offset slightly to the back.

Loading forks with adjustable suspension points have an **adjustable crane hook attachment.** The suspension point may, within limits, be positioned above the centre of gravity of the load and offset slightly to the front.

Loading forks with automatic compensation for own weight have a self-adjusting crane hook suspension point. When not under load, spring tension pushes the crane hook eye back and over the centre of gravity of the loading fork, for the loading fork forks to hang horizontal. Under load, the spring tension is overcome and the suspension point moves forward up to a stop. The suspension point can therefore only assume positions "A" (back) or "B" (front). The designation "automatic weight compensation" is misleading in the sense that the suspension point does not automatically come to rest above the centre of gravity of the load but only changes end stops. The position of the centre of gravity of the load is thus fixed by design and it is necessary here also for the forks to point slightly upwards under load.
Note in particular that loading forks with automatic weight compensation need a **minimum load for suspension point transition!** Unless specified otherwise, this minimum load to move the suspension point forward is about **20%** of the lifting capacity.

Adjustable forks may only be adjusted symmetrical to the centre. Forks and **loading height adjustments** must be secured again with bolts with cotters after adjustment.

Do not lift damaged pallets. Only work close to the floor. The load must be additionally secured with a net or cage when working with loading forks at greater height or on building sites.

Grabs

Designated use
Detachable load lifting apparatus for lifting and horizontal transport of loads in accordance with its technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions governing first use, operation, maintenance and testing. Any other use, especially lifting of persons, lifting of loads over persons, exceeding the specified lifting capacity and operation by untrained staff is deemed improper.

a) Positive fitting grabs
Positive fitting grabs hold the load around its sides or under it. The load must be dimensionally stable to withstand the pressure of the grabbing jaws. Especially when using grabs, the load must always hang horizontally. Long loads may therefore not be lifted with only one grab, since they may swing and potentially slide out of the grab.
Grabs are designed with several points of hinging. Keep your hands away from these hinged points during operation – always only use the handles. If there are no handles, handle the grab as near to the top of the suspension point as possible.
To prevent uncontrolled closing of the grab, always set down and fully relieve the grab from its load, then unlatch the catch hook. The **spindle grab,** which can be closed when suspended above the load and therefore has no device for holding it open, is the exception.
After locking and before lifting, check for positive fitting contact between grab and load.

The manufacturer's specification of gripping width must be complied with in terms of minimum and maximum size. Manufacturing tolerances and elastic deformations of the grab have been taken into account.

Never use a positive fitting grab as a friction locking grab!

b) Friction locking grabs
The following must also be observed i.r.o. friction locking grabs:

Friction locking grabs may only be used for workpieces with vertical surfaces on which the grab's friction pad can fully engage. The safety factor to prevent the load from slipping must be 2. Adequately secure gripping force is a function of jaw pressure and the coefficient of friction between grab jaws and workpiece. Note that the security of the grip depends only on the friction value and the grab position, not the weight of the load. A scissor grab in this respect exerts higher closing pressure on a workpiece when the jaws are open wider than with its jaws more closed. It is thus possible that a large, heavy workpiece is held securely whilst a small, light workpiece may "slip out". Unless specified otherwise, we assume a friction coefficient between materials of = 0.5.

The gripped object must be **dimensionally stable.** The friction coefficient specified by the manufacturer is the minimum permissible. The workpiece surface and the grab jaws must be checked for moisture, oil dust, etc., which reduce friction.

Especially when working with friction locking grabs, ensure that the load does not swing or collide during lifting and transport.

Turning grabs
Turning grabs come as positive fitting or friction locking designs. The **centre of gravity of the load** must be on the axis of rotation to avoid large restoring forces! These may cause the load to topple and drop, which may result in the permissible stress on the grab being exceeded. Note, in particular, that the centre of gravity changes as a **container is emptied**. A serious risk of injury exists!

If the centre of gravity of the handled load is not on the axis of rotation, then a turning grab with dampening gears must be used.

Jib for forklifts

Designated use
Detachable load lifting apparatus for lifting and horizontal transport of loads in accordance with its technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions governing first use, operation, maintenance and testing. Any other use, especially lifting of persons, lifting of loads over persons, exceeding the specified lifting capacity and operation by untrained staff is deemed improper.

Jibs extend the range of application of forklifts. Loads may be lifted and dropped off again at larger distances and also at greater heights. This inevitably changes the **balance conditions of the forklift.** Before using a forklift boom, therefore, check if the forklift is suited for the required task. It may, for instance, be necessary to use a 3 ton forklift to safely transport a 500 kg load.

The LLA must **absolutely be secured against slipping out** after the forklift forks have been inserted in the LLA pockets. This is normally achieved using a chain which is wrapped around the mast and which can be shortened to fit tightly, or using locking levers pressing against the forklift forks. Ensure, in this case, that the pin presses fully against the fork and tighten the locking handle well.

Position the lifting hook above the centre of gravity of the load and rig the load using suitable slings to prevent uncontrolled sideways sliding when lifting. Lift carefully and check level suspension.

Always drive slowly when moving loads with the forklift! Bear in mind the balancing conditions and the forces arising when braking and negotiating uneven floors.

Observe the load diagram on the forklift jib - See page 315

Safe use and purpose of Certex Permanent Load Lifting Magnets

Read these operating instructions carefully before using the product. Please contact Certex (UK) for any further information on safe use.

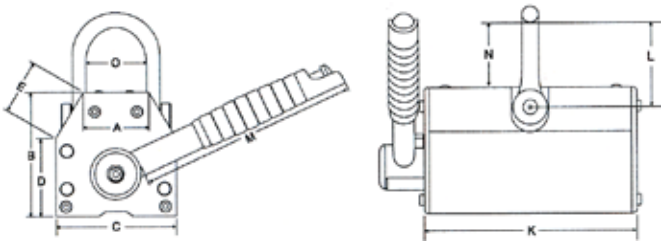
Check the supplied magnet for completeness and possible damages.

Permanent magnets are easy to use and their design is safe and user-friendly. This is why load lifting magnets are widely used as load lifting devices in many sectors of industry, in shipyards or for handling of cargo.

Using magnets can improve working conditions and increase effectiveness.

Designated use
Permanent magnets are used to lift and move metal blocks and cylindrical workpieces.

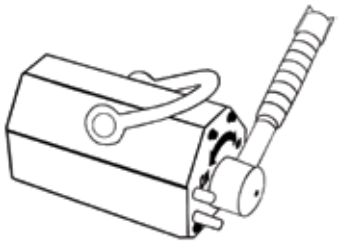
Design
The NdFeB magnets have a strong permanent magnetic field. The magnetic field is activated and deactivated by a manually operated lever. The lifting eye fitted on the magnet serves for connecting to a suitable lifting apparatus. The V-groove on the underside of the magnet enables safe lifting of round workpieces.



Dimensions

Lifting capacity	100 kg	300 kg	600 kg	1 t	2 t
W mm	62	92	122	176	234
L mm	92	162	232	258	378
H mm	67	91	117	163	212
I mm	126	155	196	285	426
Max. manual force in kg	< 80	< 80	< 80	< 80	< 80
Weight in kg	3	10	24	50	125

Use
Remove rust, chips or other dirt from the surfaces before use. Position the magnet centrally above the centre of gravity of the workpiece. After placing the magnet, swing the lever from OFF to ON. Ensure that the safety lock of the lever is latched before you lift the load.



Never exceed the lifting capacity of the magnet. No persons may be present under loads suspended from load lifting magnets. The ambient temperature and the temperature of the lifted workpiece must be between – 40° and + 80° Celsius. Shock loads and strong vibrations are prohibited.

When lifting round workpieces, the surface of the load must mate with both sides of the V-groove along its length. With cylindrical workpieces, the lifting capacity of the magnet is always reduced to 30%.

After lifting and setting down the load again, press the button to open the safety lock and swing the lever from ON to OFF. The magnet is now deactivated and will release the workpiece.

Factors influencing the lifting capacity of load lifting magnets
Before using the magnet, the effective lifting capacity, given the workpiece shape, material thickness and air gap must be established. Please use the following table of maximum lifting capacity for this purpose, as a function of these factors.

Lifting capacity in kg for low-carbon steel S 235 JR (St. 37)

	Material thickness	Clean and flat polished surface, air gap approx. 0.1 mm		Rusty/hot-rolled surface, air gap approx. 0.2 mm		Irregular and rough surface, air gap approx. 0.4 mm		Very rough surface, air gap > 0,5 mm
Lifting capacity	mm	Sheet metal, plates	Round material	Sheet metal, plates	Round material	Sheet metal, plates	Round material	
WLL 100 kg	45	100	30	85	25	70	20	Please ask your supplier
	40	95	28	80	23	65	19	
	30	85	25	70	20	60	17	
	20	75	22	60	18	50	15	
	10	50	15	40	13	35	10	
	5	25	8	20	5	15	5	
WLL 300 kg	40	300	90	250	75	200	60	
	30	270	80	225	68	185	55	
	20	250	75	200	63	175	50	
	10	150	45	125	38	100	30	
	5	75	23	60	19	50	15	
WLL 600 kg	40	600	180	500	150	400	120	
	30	540	160	450	135	375	105	
	20	500	150	425	125	350	100	
	10	300	90	250	75	200	60	
	5	150	45	125	38	100	30	
WLL 1000 kg	50	1000	300	850	250	700	200	
	40	950	285	800	240	660	190	
	30	900	270	750	225	630	180	
	20	850	255	700	210	600	170	
	10	750	225	625	180	525	150	
	5	500	150	425	125	350	100	
WLL 2000 kg	60	2000	600	1700	500	1400	400	
	50	1900	570	1600	475	1300	380	
	40	1800	540	1500	450	1250	360	
	30	1700	510	1400	425	1200	340	
	20	1500	450	1250	375	1000	300	
	10	1000	300	850	255	700	200	

Supplementary to the aforementioned lifting capacities, the effect of carbon content of the steel must also be considered. The following factors must be applied when determining the permissible lifting load:
1.00 for low-carbon steel
0.95 for steel with medium carbon content
0.90 for steel with high carbon content
0.75 for low-alloy steel types
0.50 for cast iron parts

Notes on maintenance and safety
Do not damage the contact surfaces during the use and transport of magnets. Lubricate the surface lightly after use.

Check the safety lock of the lever regularly. Ensure that it moves freely and that the safety bolt closes properly.

Only operate the lever after the load lifting magnet has been positioned on a magnetic workpiece.

Only qualified and trained persons may use the magnet and carry out maintenance.

Modifications to load lifting magnets jeopardise safety and are prohibited.

Every load lifting magnet must be checked by a qualified person at least every 6 months. All the components must be checked in addition to the load test, to ensure adequate safety.

The magnet must be scrapped to prevent further use if its enclosure or moving parts are damaged.

Safe use and purpose of shackles

Use and maintenance of shackles

⚠ It is imperative to read these instructions before use.

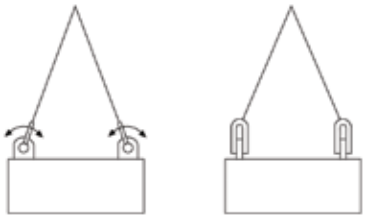
Designated use:
Detachable links for rigging and lifting of loads in accordance with their technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions for first use, operation, maintenance and testing.
Any other use, especially lifting of persons, lifting of loads over persons, exceeding the specified lifting capacity and operation by untrained staff is deemed improper.

Shackles must be selected according to the required lifting capacity and the technical specifications.
The permissible lifting capacity must under no circumstances be exceeded.
Shackles must be checked as follows before use:

- Shackle body and pin are matched in terms of size, design and lifting capacity.
- Marking, incl. specified lifting capacity, is clearly legible.
- Neither shackle body nor pin show signs of damage.
- Wear, threads, cracks, corrosion, deformation

The shackle may not be used unless it is without defects.
The shackle pin must be tightened firmly before taking up a load.
The pin collar must be tight against the shackle eye and the full thread length must be screwed in.
Shackle components may only be replaced with original supplier spares.
Shackles may not be subjected to lateral forces. The stress must be along the centre line.

Shackle 1

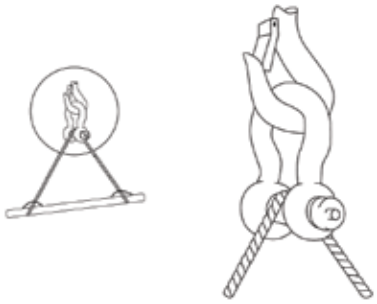


Different use is subject to approval by the manufacturer. The slinging angle must be considered when using shackles in multi-leg slings.
The stress in the single leg sling and on its shackle increases as the slinging angle increases.
Slinging angles › 60° are not permitted.
Bow shackles are used for linking multi-leg slings to crane hooks. The slings must In this case be positioned in the shackle body and the pin in the crane hook.
The load must be secured well. Especially the load's centre of gravity must be considered here.
No shock loads.
Spacers may be used on the pin to prevent lop-sided stress. Welding on spacers or deforming the shackle is prohibited.
Loosening of the pin due to movement of the load or slings must be prevented.
Shackles may not rest on edges or be subjected to bending stress.
Shackles with bolts, nuts and safety pins are used for permanent connections.
Do not use with unstable loading.

Shackle 2

Shackles must not be modified. Only the manufacturer is allowed to work on shackles (e.g. heat treatment, welding, mechanical work, galvanising, coating or similar).
Permissible working temperature - 20°C to + 200°C.
Shackles may not be exposed to acids or other chemicals without the consent of the manufacturer.
A competent person should assess the risk and reduce the permitted lifting capacity for applications posing special hazards (offshore application, transportation of molten or corrosive substances, nuclear materials or persons).
Shackles must be checked for visible defects prior to use.
Shackles must be regularly checked by a competent person.
The interval for checking should not exceed 6 months and can be shorter in case of special stresses.
Non-compliance with these instructions will render warranties null and void.
These instructions for use must be stored together with the shackles and must be available to the operator at all times.

Shackle 3



Safe use and purpose of Camlock Lifting Clamps

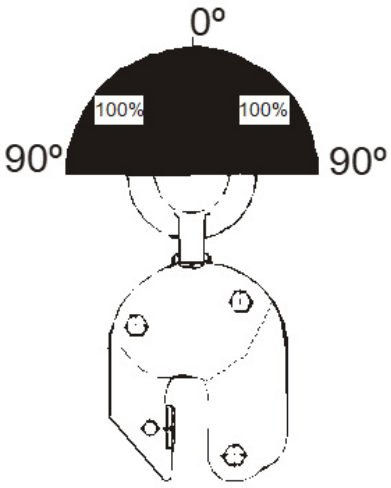
Vertical Plate Lifting Clamps Type 92 Series

CAMLOCK CZ92

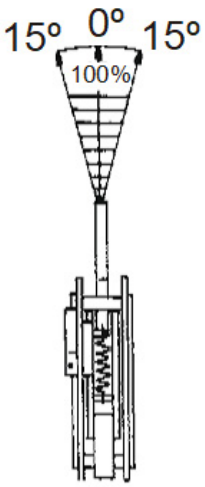
Lifting clamps can lift and turn over plates in one smooth operation. The Universal Clamp enables plates to be turned over or lifted from the horizontal to the true vertical position. Standard features include, hardened steel jaws for a positive grip and a double locking mechanism, locking the clamp open and closed onto the plate.

Model	CZ921500	CZ92200	CZ92300
W.L.L. tonnes	1.5	2	3
Self weight kg	3	8	10
Plat thickness mm	0-20	0-32	0-32

Load Diagram with lifting slings vertical (applicable to the CX and CZ series also).



Loads weighing the maximum W.L.L. may be lifted and turned through 180 ° in the plane of the clamp.



Loads weighing the maximum W.L.L. may be lifted within 15 ° of the plan of the clamp.s

Type and Quality of Plate

The Camlok CZ 92 series of plate lifting clamps (also applicable to all Camlock lifting clamps for horizontal transport including CH, CX, CY series) can be used on all structural steel plates and sections up to a surface hardness of 300 Brinell (32RHC). For other materials consult your supplier before use. The weight of the plate MUST exceed the value for minimum load stamped on the side of the clamp. Extra care must be taken when lifting plates of less than 20% of the rated jaw capacity

Fitting

Check that the plate is mild steel, free from grease, oil, scale and paint. Take the weight of the clamp. Lifting sling must be slack. Turn the locking lever clockwise to lock the jaws open. Position the clamp on the edge of the plate over the centre of gravity and to the full depth of the mouth. Place the fixed jaw onto the plate and turn the lever to the 'LOCK' position. Check correct fitting and position before lifting.

Lifting

Check position and fitting of clamp as weight is applied. Lift slowly and smoothly at all times. Take extra care at the transition from horizontal to vertical lifting. Lifting slings must be vertical at all times Take precautions to stop the load from swinging. lace loads down gently. Fast lowering may release the clamp. DO NOT lower if the locking lever is not in the 'LOCK' position.

Transporting

Take precautions when transporting loads that the plate will not collide with any objects. Minimise load swing. Minimise the danger area by moving plates as close to the ground as possible.

Release

The clamp can only be released when all the load is removed. The lifting sling must have sufficient slack to allow the hookring to withdraw into the clamp. Push the hookring down and into the clamp shell while turning the locking lever. Do not force or hit the lever. The clamp is now ready for the next lift.

Safety

ALWAYS check the operation of your 'Camlok' lifting clamp before use.
NEVER use a worn or damaged 'Camlok' lifting clamp.
NEVER lift more than one plate at a time.
NEVER exceed the maximum working load limit.
NEVER fast lower, always gently lift and lower.
NEVER force the locking lever.
NEVER stand under a suspended load and if guiding a load by hand always place the palm of the hand on top of the load. NEVER grip the load with fingers on the underside. Always stand clear when lifting or lowering.
Always keep a record of inspections and repairs

Testing

All 'Camlok' lifting clamps are tested before sale to a proof load of twice the working load limit. Any clamp that has been repaired must be tested to this load before re-entering service.

Care and Maintenance

De-grease clamps regularly.
Remove all grit, dirt and mud.
Lubricate all moving parts with a soft grease.
Inspect every 1-4 weeks, depending on use.
Check for wear in the jaw teeth, cam faces, hookring and chain.
Check for distortion in the shell plates, jaw bolt, internal links and the spring.
Check any welds for cracks.
Check for smooth operation.
Check fasteners for integrity and tightness

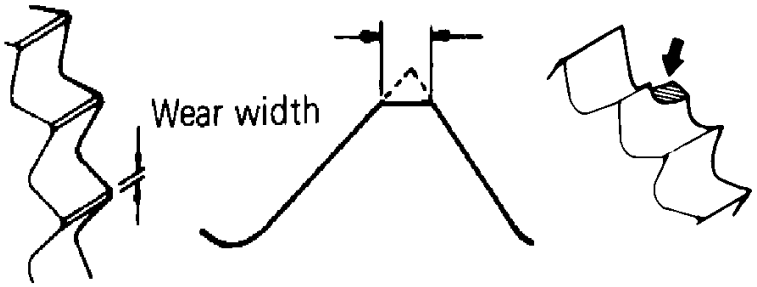


fig a fig b

The maximum wear width as shown in fig a above should not exceed the dimensions shown in the table below.

CZ 92 1500	CZ 92 2000	CZ92	3000
0.6-0.8mm	0.8-1.0mm	0.8-1.0mm	

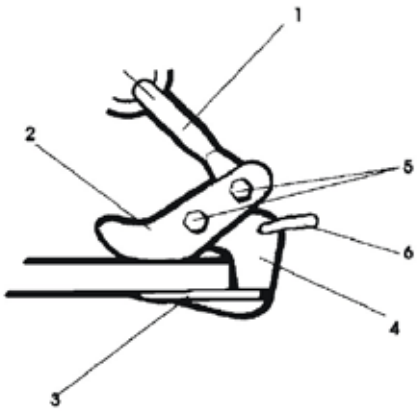
Chipped teeth are only acceptable if the chip is less than half the width of the tooth and the adjoining teeth are undamaged. (See fig b)

All fasteners fitted to 'Camlok' lifting clamps are retained with Loctite 270 Thread Locking compound DO NOT use any other grade. Please refer to page 442/3 for quick tips on lifting, turning and correct fitment onto plates.

Operating Instructions for Camlok Horizontal Plate Lifting Clamps Type CH with Smooth Jaws

Used in pairs the CH clamps are ideal for loading machines and moving plate material in the horizontal position. A single pair of clamps fitted to a two leg chain sling are all that is required for lifting short lengths of plate. The two jaws and wide toe plate give the clamp a stable grip on the plate. The integral shackle ring will accept chain sling hooks or wire rope slings directly.

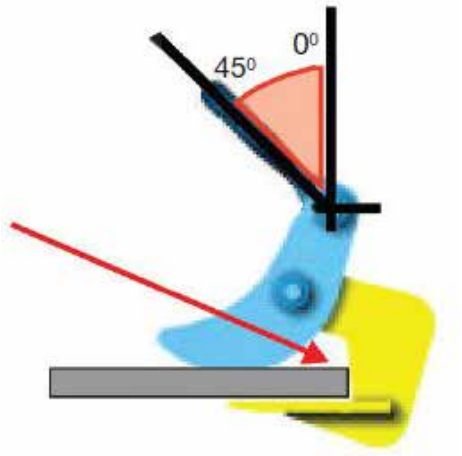
Model	WLL Kg Per Pair	Plate Thk mm	Weight Kg
CH1	1000	5-32	8
CH2	2000	5-32	11
CH 2L	2000	20-50	12
CH 4	4000	5-50	17
CH 4L	4000	50-100	23
CH 6	6000	5-75	46
CH 6L	6000	50-125	56
CH 8	8000	5-100	53
CH 8L	8000	50-125	60
CH 10	10000	5-100	95
CH 10L	10000	50-150	108

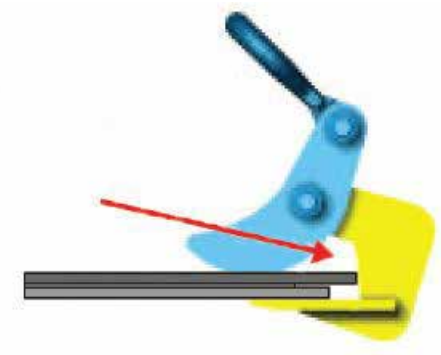


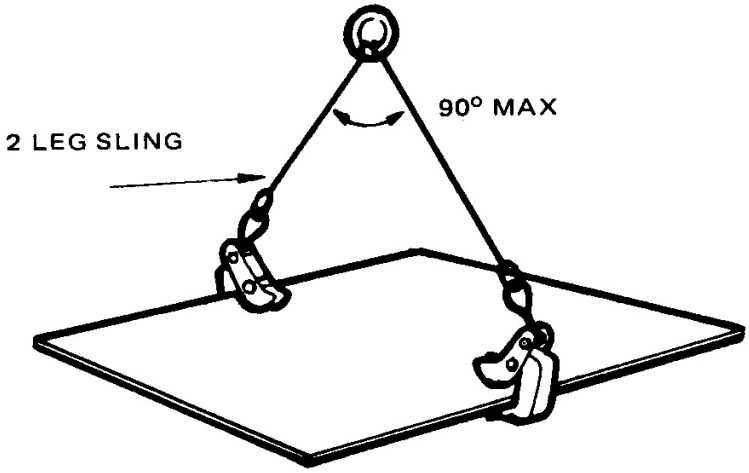
1. Shackle
2. Jaws (Pair)
3. Toe Plate
4. Body
5. Bolts and Nuts (Pair)

Please refer to page 436 for fitting, lifting, transporting release, testing and care and maintenance.

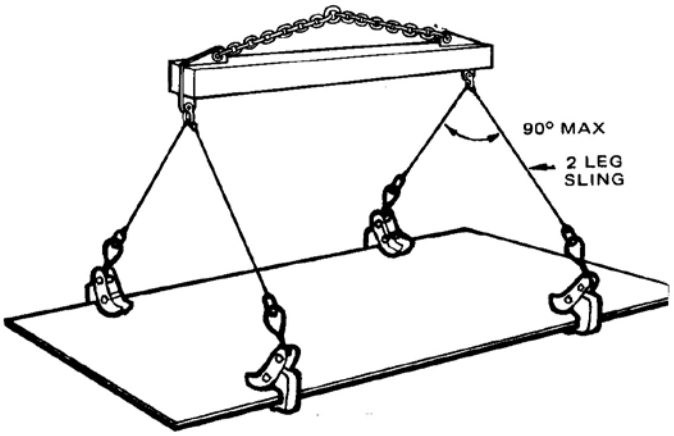
All fasteners fitted to Camlok clamps are retained with Loctite 270 Thread Locking compound DO NOT user any other grade.







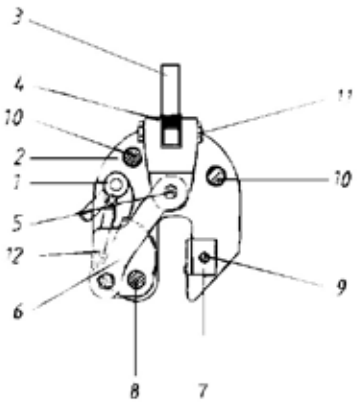
Use one pair of clamps for short plates.

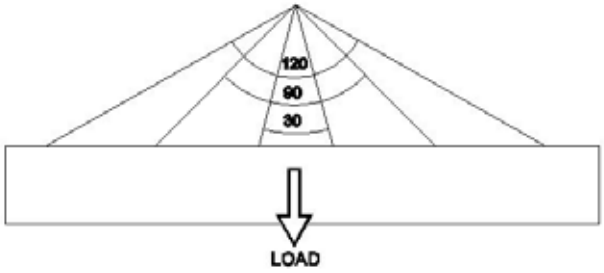


Use a lifting beam or a spreader beam for long plates. DO NOT use endless chain slings or 4 leg sling.

CX Heavy Duty Hinged Clamp 1500 10000kg

- 1. Cam and lever
- 2. Side plates
- 3. Eye cam
- 4. Hooking fork
- 5 Hookring pin
- 6. Internal assembly inc jaw
- 7. Pad
- 8. Jaw bolt and nut
- 9. Pad screw and nut
- 10. Spacer pins and screws
- 11 Swivel bolt and nut
- 12 Spring





Safe Loads for two clamps

The CX series of clamps can be used on a two leg sling for moving long loads. There is a reduction in the W.L.L as shown in the table.

Angle	CX1500	CX3000	CX6000	CX8000	CX10000
0-30	3000kg	6000kg	12000kg	18000kg	20000kg
30-90	1500kg	3000kg	6000kg	8000kg	10000kg
90-120	750kg	1500kg	3000kg	4000kg	5000kg

With the swivelling hook ring the CX series of clamps can be fitted to a steel plate in any position. It can turn a plate from the horizontal to teh vertical or lift over the edge. Sufficient clamping load is guaranteed by the special shape of the eye cam.

Please refer to page 435 for the Load Diagram with lifting slings vertical.

CX 1500	CX 3000	CX6000	CX 8000	CX 10000
0.6-0.8mm	**0.8-1.0mm**	**1.0-1.2mm**	**1.0-1.2mm**	**1.2-1.4mm**

The maximum wear width as shown in fig a and fig b on the top of page 437 should not exceed the dimensions shown in the table above.

Chipped teeth are only acceptable if the chip is less than half the width of the tooth and adjoining teeth are undamaged (refer to fig b on the top of page 437.)

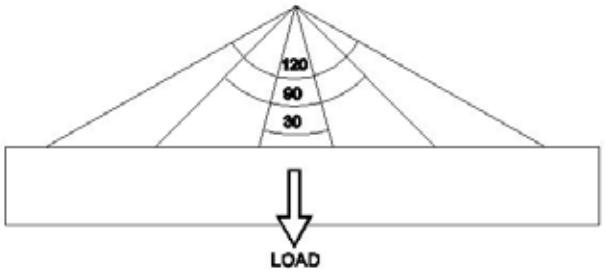
All fasteners fitted to Camlok lifting clamps are retained with Loctite 270 Thread Locking compound DO NOT use any other grade.

CY 'Hinged' Vertical Plate Clamps

Please refer to page 436 for fitting, lifting, transporting release, testing and care and maintenance.

CY1	CY2	CY3
0.6-0.8mm	0.8-1.0mm	0.8-1.0mm

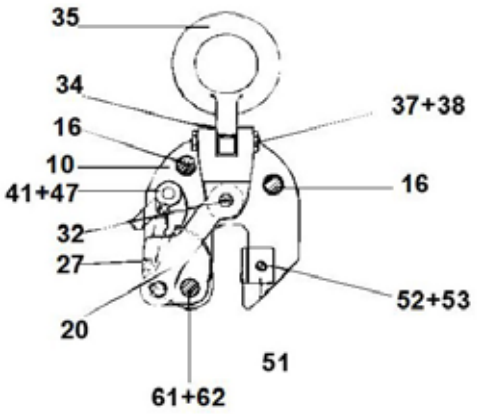
The maximum wear width as shown in fig a and fig b on the top of page 437 should not exceed the dimensions shown in the table above.
Chipped teeth are only acceptable if the chip is less than half the width of the tooth and adjoining teeth are undamaged (refer to fig b on the top of page 437.)
All fasteners fitted to Camlok lifting clamps are retained with Loctite 270 Thread Locking compound DO NOT use any other grade.



Angle	CY1	CY2	CY3
0-30	2000kg	4000kg	6000kg
30-90	1000kg	2000kg	3000kg
90-120	500kg	1000kg	1500kg

The CY series of clamps can be used on a two leg sling for moving long loads. There is a reduction in the W.L.L. as shown in the table above.

- 41+47. Cam and lever side plates
- 10. Side plates (set of 4)
- 35. Swivel hook ring
- 34. Hooking fork
- 32. Hookring pin
- 20. Internal assembly inc jaw
- 51. Pad
- 61+62. Jaw bolt and nut
- 52+53. Pad screw and nut
- 16. Spacer pins and screws
- 37+38 Swivel bolt and nut



Operating Instructions

Model:	CY1	CY2	CY3
W.L.L.	1000kg	2000kg	3000kg
Self weight	4.5kg	13.0kg	13.5kg
Plate thickness	0-22mm	0-32mm	0-32mm

With the swivelling hook ring the CY series of clamps can be fitted to a steel plate in any position. It can turn a plate from the horizontal to the vertical or lift over the edge. Sufficient clamping load is guaranteed by the special shape of the hookring.

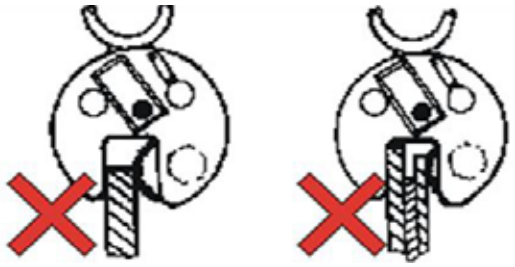
Please refer to page 435 for the Load Diagram with lifting slings vertical.

Operating Instructions for Camlok Verticale Plate Lifting Type CZ 1-4

CZ clamps can lift and turn over plates in one smooth operation. The universal clamp enables plates to be turned over or lifted from the horizontal to the true vertical position. Standard features include, hardened steel jaws for a positive grip and a double locking mechanism, locking the clamp open and closed onto the plate.

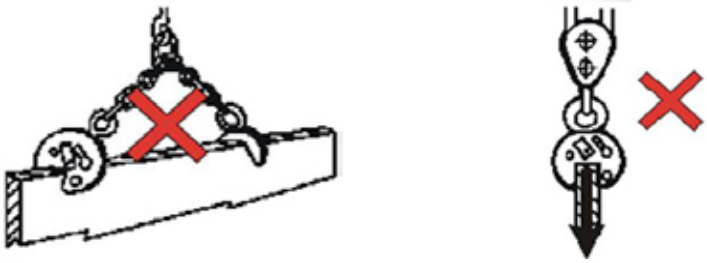
Please refer to page 435 for the Load Diagram with lifting slings vertical.

Incorrect Fitting



Incorrect Lifting

Do not fast lower onto the floor as the crane hook will force open the clamp and release the plate.



Incorrect Releasing

Insufficient slack in sling.
Operating lever only moves part way and plate is not released.
Force will cause failure of campshaft.

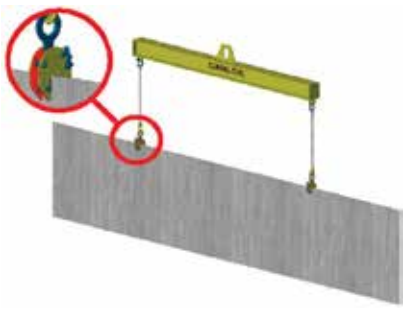
The maximum wear width as shown in fig a and fig b on the top of page 437 should not exceed the dimensions shown in the table below.

Model	Wear Width mm
CZ1	0.6-0.8
CZ2	0.8-1.0
CZ3	0.8-1.0
CZ4	0.8-1.0
CZ6	1.0-1.2
CZ 8	1.0-1.2
CZ 10	1.0-1.4
CZ12	1.2-1.6
CZ 15	1.2-1.6
CZ 20	12.-1.6
CZ 30	1.2-1.6

Chipped teeth are only acceptable if the chip is less than half the width of the tooth and adjoining teeth are undamaged (refer to fig b on the top of page 437.)
All fasteners fitted to Camlok lifting clamps are retained with Loctite 270 Thread Locking compound DO NOT use any other grade.

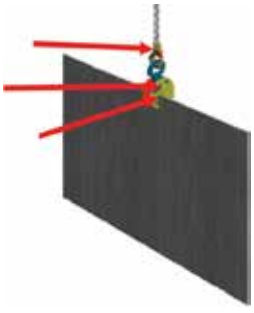
For Lifting Long Plates
Two clamps and a lifting beam must be used.

Plate at full depth and lever in locked position



For Lifting Short Length Plates
A single clamp may be used.

Always use a safety hook or safety sling.
Check lever is in locked position
Ensure plate enters full depth of the clamp.

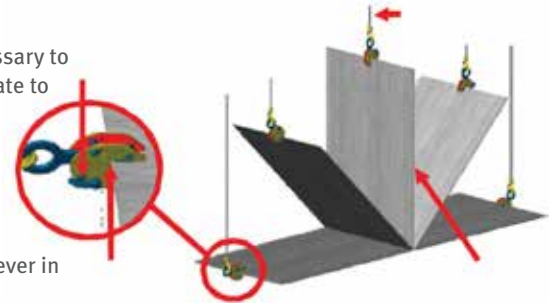


For Turning Over Plates
Plates must be in contact with the back of the clamp.

If locking lever is uppermost it is necessary to lift the clamp when sliding onto the plate to allow free movement of the jaw.

Ensure full depth of grip with locking lever in locked position.

Lifting sling must be vertical for all positions



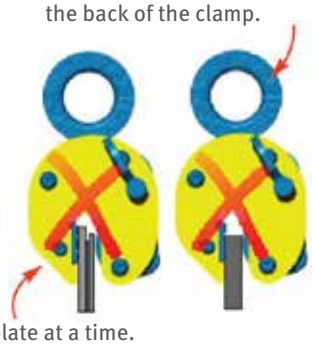
Take extra care when clamp takes least weight at “top dead centre”

For lifting Short Plates
For this type of lift only use CY/CX hinged plate clamps.

Always check positioning of clamp before use.

Always ensure that the plate is positioned to the back of the clamp.

Applicable to the CX/CY hinged plate clamps



Only lift one plate at a time.

Insufficient slack in sling Operating lever only moves part way and plate is not released. Do not force but tap chain lug if stuck. Force will cause failure of camshaft. Do not lower if lever is not in the locked position.

Safe use and purpose of textile slings

Designated use

Detachable links for rigging and lifting of loads in accordance with their technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions for first use, operation, maintenance and testing.
Any other use, especially lifting of persons, lifting of loads over persons, exceeding the specified lifting capacity and operation by untrained staff is deemed improper.

Applied standards

- European Machinery Directive (2006/42 EEC) for all EU member states for compliance with the CEN standard and EN 13155:2003 "Cranes. Safety. Non-fixed load lifting attachements
- European Standard BS EN 1492-1 "Flat woven webbing slings made of man-made fibres for general purpose use" and BS EN 1492-2 "Round slings made of man-made fibres, for general purpose use"

Guidelines for use

- Safe use of lifting equipment: Lifting Operations and Lifting Equipment Regulations (LOLER) 1998 Approved Code of Practice and guidance
- Certex Instructions for safe use of: Flat woven Webbing Slings/Round Slings.

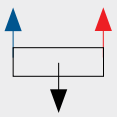
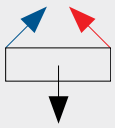
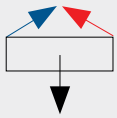
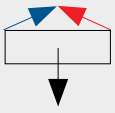
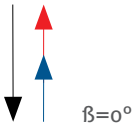
Basic rules

To select the appropriate slings, establish the weight of the load by weighing, by calculation or by reference to the shipping documents. Never just estimate the weight of the load!

The centre of gravity of the load must be known in order to correctly calculate the length and lifting capacity of the slings. If the centre of gravity is in the middle, the required length of the slings is calculated from the load dimensions and the chosen rigging method. If the centre of gravity is off the geometric centre, the single leg sling lengths must be individually matched.

Always position the crane hook above the centre of gravity.

Observe the slinging angle (ß)! The greater the slinging angle, the smaller the lifting capacity. Slinging angle › 60 ° prohibited!

Slinging angle	0° (to max. 6°)	up to 45°	45° to 60°	over 60°
				
Parallelogram of forces	 ß=0°	ß = 45°	ß = 60°	ß= 80°
	Total lifting capacity = 100% of the individual lifting capacity x 2	Total lifting capacity = 70% of the individual lifting capacity x 2	Total lifting capacity = 50% of the individual lifting capacity x 2	Total lifting capacity = 17% of the individual lifting capacity x 2Use prohibited!

Selecting the textile sling
Colour coding is identical today throughout Europe, for quick information in addition to the label. In case of dirt, the tonnage stripes are useful for immediate establishment of the lifting capacity. This prevents confusion when working fast.

Colour coding for 1.000 kg to 8.000 kg lifting capacity is given in BS EN 1492 Part 1 and Part 2.

	Direct	Basket	Choker	Basket hitch		2-leg sling		3- and 4 leg sling	
									
Slinging angle				**0 - 45°**	**45° - 60°**	**0 - 45°**	**45° - 60°**	**0 - 45°**	**45° - 60°**
Factor	**1**	**2**	**0,8**	**1,4**	**1**	**1,4**	**1**	**2,1**	**1,5**
Colour				**Lifting capacity kg**					
Violet	1.000	2.000	800	1.400	1.000	1.400	1.000	2.100	1.500
Green	2.000	4.000	1.600	2.800	2.000	2.800	2.000	4.200	3.000
Yellow	3.000	6.000	2.400	4.200	3.000	4.200	3.000	6.300	4.500
Grey	4.000	8.000	3.200	5.600	4.000	5.600	4.000	8.400	6.000
Red	5.000	10.000	4.000	7.000	5.000	7.000	5.000	10.500	7.500
Brown	6.000	12.000	4.800	8.400	6.000	8.400	6.000	12.000	9.000
Blue	8.000	16.000	6.400	11.200	8.000	11.200	8.000	16.800	12.000

Webbing slings and round slings from 10 000 kg and up are colour coded in orange acc. to Euro Standard (CEN).

Properties

Webbing slings and round slings comprise of the materials as shown below. They are labelled differently, depending on the chemical resistance of the material:

Colour code - label	Resistance	Elongation		Working temperature
		Roundslings	Webbing slings	
Polyester (PES)	acid- and solvent-resistant	1 - 1.5%	3 - 5%	* -40 to + 100°C
Polyamide (PA)	lye- and abrasion-resistant	3%	5 - 7%	* -40 to + 100°C
Polypropylene (PP)	highly resistant to chemicals	2.5 - 3%	4 - 6%	* -40 to + 800°C

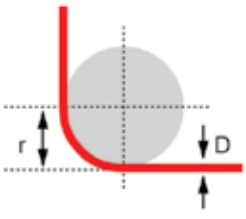
** This temperature range may change after exposure to chemical substances. In this case, please consult with the manufacturer!*

Slings must bear the manufacturer's label. This label must durably and legibly provide details on lifting capacity, effective length, manufacturer, material, standard, year of manufacture and tracking code.

Basic rules for rigging loads with textile slings

- Ensure that the crane hook is positioned above the centre of gravity of the load.
- Webbing slings and round slings may not be knotted or twisted.
- Round slings may not be extended by knotting or joining in any way. Use a round sling coupling link to extend round slings.
- Webbing slings and round slings must be used at their full width.
- Do not simultaneously use webbing slings / round slings made of different materials.
- The end eyes of webbing slings must not be too short, to avoid exceeding a 20° opening angle of the eye when rigging to a crane hook, for instance.
- With short eyes, the use of reducing rigging is recommended.
- Webbing slings and round slings may not be run across sharp edges or rough surfaces unless adequately protected. An edge is considered sharp already if the edge radius (r) is smaller than the diameter of the sling (D).

To protect the textile sling, use edge protection devices, protective tubes and PU fixed coating, etc. for sharp edges and/or rough surfaces.



	Direct	Basket	Choker	Basket hitch		2-leg sling		3- and 4 leg sling	
									
Slinging angle				**0 - 45°**	**45° - 60°**	**0 - 45°**	**45° - 60°**	**0 - 45°**	**45° - 60°**
Factor	**1**	**2**	**0,8**	**1,4**	**1**	**1,4**	**1**	**2,1**	**1,5**
Colour				**Lifting capacity kg**					
Orange	10.000	20.000	8.000	14.000	10.000	14.000	10.000	21.000	15.000

Webbing slings and round slings from 10 000 kg and up are colour coded in orange acc. to EN 1492 - 1 and 2.

Inspection and maintenance

Maintenance and care

- Never use textile slings unless they are labelled fully and clearly legible.
- Store clean, dry and well-ventilated.
- Protect against intense UV radiation, heat and aggressive substances.
- Clean webbing slings and round slings with clean water (without added chemicals).
- Hang products that are wet after use out to dry.
- Never heat or otherwise attempt to dry slings.

Checking

Have textile slings examined for visible defects at least every 6 months by a competent person before or during use (LOLER). Also check fittings, connecting elements and marking!
In case of damage or particular incidents which may affect the lifting capacity, remove the sling from service for examination by an competent person.

Signs of flaws and damage

- Chafe marks on the surface
- Longitudinal and lateral cuts, cuts on the edges of webbing slings, round sling tubes, stitches or eyes
- Chemical exposure
- Damaged or deformed fittings
- Damaged protection devices against abrasion or chafing

Discard condition (webbing slings and round slings no longer allowed to be used)

- Damage to the webbing or its edge and high count of yarn breaks, e.g. › 10% of the total number at the point most damaged.
- Heavy deformation due to heat, e.g. caused by inner and outer friction
- Damaged load-bearing seams
- Damage caused by aggressive substances
- Damage to the sheath or its stitching on slings made of endless man-made fibres
- No or illegible marking
- Deformation, incipient cracks, breakages or other damage to fittings.

Damaged slings must be identified and removed from service without delay!

General notes on hazards

Loads falling after failure of slings pose a direct or indirect hazard to the safety and health of persons in the danger zone during lifting.

- Where is the danger zone?
- Underneath the load
- Next to the load when lifting starts
- At elevated workplaces
- In the swing area of the load being lifted
- Between simultaneously lifted loads
- When hands remain between the load and rigging before lifting begins (crush hazard)

Safe use and purpose of lashings

Lashing methods

1. Direct lashing
This lashing method is preferred to the tie-down system. With this lashing method, both the pretensioned force of lashing and the permissible stress in the lashing are at work.

2. Tie-down
With the tie-down system, the lashing presses the load to be secured down onto the loading area. The securing force in this case is the pretensioned force (STF) of the lashings.
The tie-down system should only be used for lighter loads or together with anti-slide mats and lashings with a high pretensioning force.

Factors
- The following factors should be considered when dimensioning load restraining:
- Mass and properties of the load
- Friction μ
- Lashing angle ß
- Pretensioning force or permissible tensile force of the lashings
- Vehicle data
- Acceleration values

Tie-down method - recommended number of lashings

Pretensioning force	Lashing angle	Friction	Weight of load					Friction	Weight of load				
STF in daN	ß< degrees	μ	2 t	4 t	6 t	8 t	10 t	μ	2 t	4 t	6 t	8 t	10 t
150	35	0.6	8	17	xx	xx	xx	0.3	29	xx	xx	xx	xx
150	60	0.6	5	11	xx	xx	xx	0.3	19	xx	xx	xx	xx
150	90	0.6	5	9	xx	xx	xx	0.3	17	xx	xx	xx	xx
300	35	0.6	4	8	12	17	21	0.3	14	29	43	xx	xx
300	60	0.6	3	5	8	11	14	0.3	10	19	29	xx	xx
300	90	0.6	2	5	7	9	12	0.3	8	17	25	xx	xx
450	35	0.6	3	6	8	11	14	0.3	10	19	29	39	48
450	60	0.6	2	4	5	7	9	0.3	6	13	19	26	32
450	90	0.6	2	3	5	6	8	0.3	6	11	17	22	28

Remark
At least 2 lashings must be used at all times.
The table allows for only 50% of the specified STF for the side opposite the tensioning device.
The number of required lashings is reduced by 25% if the pretensioning force on both sides of the lashing is verifiably equal to the STF.

Friction coefficients μ
The existing friction plays an important role with load restraining.
We generally recommend the use of friction mats with the tie-down method.

Material	dry	wet
Wood/wood	0.20-0.50	0.20-0.25
Metal/wood	0.20-0.50	0.20-0.25
Metal/metal	0.10-0.25	0.10-0.20
Concrete/wood	0.30-0.60	0.30-0.50

Safe use and purpose of textile lashings

Designated use
Detachable links for fastening and restraining of loads in accordance with their technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions governing first use, operation, maintenance and testing. Any other use, especially use by untrained persons, is deemed improper.

General
Lashing straps made of man-made fibres are manufactured in one- and two-piece types.
One-piece lashing straps are used to strap the load. They normally comprise a woven textile strap and a tensioning device.
Two-piece lashing straps consist of two woven textile straps. One is fitted with a tensioning device and both have an end fitting.

Important notes
1. All loads must be adequately restrained before starting on a trip. The required number of lashings must be calculated according to BS EN 12195-1.
2. Staff tasked with restraining the load must be trained.
3. The lashings must be suited for the specific load and intended use.
4. The lashings must be in perfect condition.
5. Any partial unloading must be taken into account.
6. At least 2 lashings must be used at all times when using the "tie-down" system.
7. 2 pairs of lashings must be used for "diagonal lashing".
8. Before removing the lashings, ensure that the load is stable without them.
9. Lashings may not be knotted.
10. Lashings with different elastic elongation may not be used on the same load (e.g. lashing chains and lashing straps).
11. Do not run lashings over unprotected sharp edges.
12. Lashing straps may not be used for lifting.
13. Lashing straps must be cleaned after exposure to aggressive substances.
14. Do not overload lashings.
15. Do not subject tensioning devices and end fittings to bending.

Discard condition of lashing straps
Lashing straps must be removed from service if they show any of the following signs of damage:

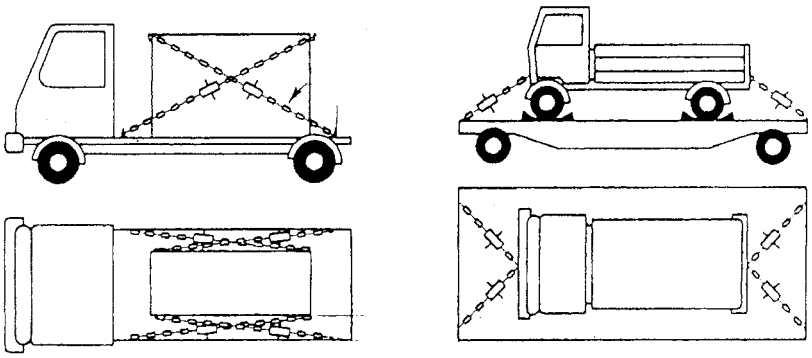
- Cracks, cuts, notches and breakages in load-bearing fibres and seams of the belt straps.
- Belt straps with deformation due to heat or aggressive substances.
- Tensioning devices and end fittings with deformations, cracks, heavy wear and tear or corrosion.
- No label or illegible label.

Safe use and purpose of lashing chains in acc. with BS EN 12195-3

Designated use
Detachable devices for fastening and restraining of loads in accordance with their technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions governing first use, operation, maintenance and testing. Any other use, especially by untrained persons, is deemed improper.
When selecting and using lashing chains, the required lashing force, intended application and type of load to be lashed must be considered.
Task only qualified and instructed persons with the use and repair of lashing chains.
Selection is determined by the size, shape and weight of the load as well as the intended use and the transport conditions.
Refer also to BS EN 12195-1 for information on calculation, selection and dimensioning of lashings.
Do not use long-link chains for general lashing.
The lashing chain must be strong and long enough for the intended purpose.
Plan the lashing and also removing the chains again before starting to lash. Remove slings before lashing.
Any partial unloading must be taken into account. Calculate the number of lashing chains to be used in acc. with DIN EN 12195-1.
Due to different behaviour and change in length under load, never use different lashing means (e.g. chains and straps) for lashing the same load.
Additional connections and lashing devices must match the lashing chain.
Removing the lashings: before opening, ensure that the load is stable even without lashings and that persons tasked with offloading are not in danger.
If necessary, to prevent toppling, rig slings intended for further transport already before lashings are removed.
Release the lashing chains for the load to stand freely before offloading. Look out for low overhead lines and other obstructions during loading and offloading.
Lashing chains must be removed from service and returned to the manufacturer for repair if they show any signs of damage.

The following signs are indicative of damage:
1. on round steel chains: surface cracks, › 3% elongation, wear of 10% or more of nominal thickness, visible deformation.
2. on linking parts and tensioning devices: deformations, cracks, serious indications of wear, signs of corrosion.

Ensure that the lashing chain is not damaged by sharp edges.
Use only lashing chains with legible marking tags.
Lashing chains must not be overloaded: the max. manual force allowed is 50 daN. Mechanical aids such as rods or levers etc. may not be used unless they are part of the tensioning device.
Lashing chains that are knotted or linked with bolts and screws may not be used.
The lashing chains and edges of the load must be protected against abrasion and damage. Use suitable edge protectors.



Assembly instructions applicable to EC-RL 2006/42/EC annex VI

The following must be taken into account when assembling machine parts or load bearing devices with the purpose of assembling these parts and other components to create a complete machine, without endangering the safety and health of persons:
Assembly work, installation and commissioning of powered machines may only be carried out by qualified and authorised persons.
Assembly tasks must be performed professionally in compliance with relevant codes of practice.

The following must be properly performed prior to assembly:

- Read associated documentation carefully
- Exclude hazards due to, for instance:
  - Environmental impact
  - Electrical power
  - Moving parts
  - Falling when working at heights
  - Actuation of control devices
  - Assuring that the complete machine and all its individual components are capable of handling the forces arising

During assembly

- Wear protective equipment
- Use only suitable tools
- Ensure stable positioning of the machine
- Do not exceed the machine's load-bearing capacity
- Take applicable safety factors into account
- Ensure adequate stability under all operating conditions, also in transport and when dismantling
- Avoid additional stress due to tensile or shearing forces or pressure
- Use prescribed torques
- If bolts and nuts are used, at least 3 turns of the thread should protrude from the nut

Welding required during assembly may only be carried out on incomplete machines or load-bearing equipment designated for that purpose, if:

- the relevant welding instructions are at hand and complied with
- the work is performed and checked by suitably trained specialised staff

Threaded sling attachment points may only be stressed at rated capacity if the entire threaded length is screwed into suitably strong material.
Linked sling elements must move freely.
When releasing the ends of wire ropes wound on reels or coiled, these ends may recoil and cause injuries or damage. Appropriate measures must be taken before releasing to avoid recoil.

After assembly

- Incomplete machines and load-bearing devices may only be used as designated, even after assembly.

Basics

In addition to this basic information, please observe the notes on the purpose and safe use of the individual categories of products.

Plan of action

Every lift should be planned before starting. Plan to suitably and economically match the extent and complication of the task.
Not all lifting actions require written documentation of the process.
In order to guarantee safety when using load lifting apparatus, the 20 questions in the overview below must all be answered before lifting.
Our catalogue of questions includes only the minimum requirements which must be supplemented by the user, if necessary.

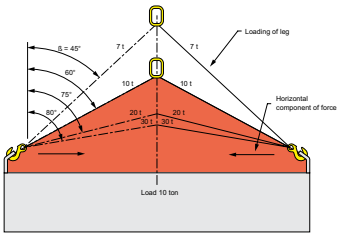
Question	Examples
Is a qualified person taking responsibility?	Crane driver, loading foreman, safety engineer
Are the communication arrangements clear?	Hand signals, radio communication
Is the load lifting apparatus in good condition?	Regular inspection, visual checks before use
Is the load lifting apparatus suited for the lifting task?	Webbing slings are damaged by sharp edges
Is all load lifting apparatus properly marked?	Lifting capacity tag, labels, stamps
Is the lifting capacity of all load lifting apparatus known?	Lifting capacity shown on the sling
Is the lifting capacity of the load lifting apparatus adequate?	Consider the slinging angle
Is the weight of the load known?	Shown on the load or in the accompanying documents
Where is the load's centre of gravity?	Centre of gravity indicated in the drawing
What are the slinging angles?	Slinging angles must be considered when selecting the sling
Is loading symmetrical on the sling legs?	Unequal slinging angles indicate unequal loading
Are slings protected against sharp edges?	The edge radius must be greater than the sling diameter
Is the load bearing hook positioned above the centre of gravity of the load?	The load will swing if the crane hook is not above the centre of gravity
Is the selected type of slinging suitable for the load?	Single leg slings are not suited for long, slender loads
Is load control assured?	Load movement may be controlled with a tagline
Are all persons out of the danger zone?	Do not move suspended loads over persons
Are there further risks / hazards?	Staff crossing the transportation route
Is the load held firmly and safely?	Rigging or load may shift
Any unusual influencing factors to be considered?	Additional wind loads, obstacles, power lines or similar
Any special requirements?	Loads must be turned

Slinging angles

Slinging angles have a significant effect on rigging.
The greater the angle ß, the greater the load on the particular leg.

Slinging angles › 60° are prohibited!

The load must be capable of taking the horizontal forces!

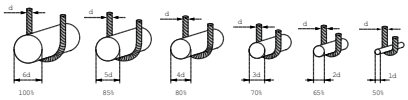


Bending radius D/d

It is imperative with a basket hitch to take the sling diameter/bending radius ratio into account when selecting the sling.

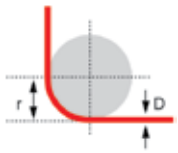
D/d should never be ‹ 1:1

Also account for this factor at all connecting points. (Shackle/wire rope sling, etc.)



Sharp edges

Slings must be protected against sharp edges.
Never run slings over unprotected sharp edges!
An edge is sharp if its radius is smaller than the diameter of the sling!



Qualified persons

Many factors must be considered when lifting. Assign only trained staff to working with load lifting equipment.

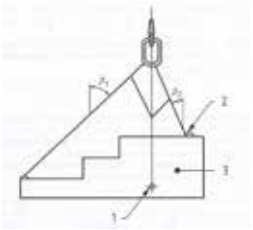
Only trained staff have the necessary knowledge to account for special factors such as use in the presence of lyes, acids or other aggressive media, temperature effects, carrying capacity of substrates, wind loads, impact loads, etc.

Centre of gravity

The centre of gravity of the load must always be directly beneath the crane hook!

1 = Centre of gravity of the load
2 = Suspension point
3 = Load
ß 1-2 = Slinging angle

Unequal slinging angles may indicate unequal loading of the slings. Unless symmetrical loading of the legs is assured, it must be assumed that one leg bears all the load.



Suspension point

The points connecting the load and the sling must be dimensioned to handle the slinging forces.

Observe welding or assembly instructions!

Connecting elements

All the links between the components of the rigging, between load and sling and between the sling and the lifting gear must be able to move freely. All anchoring points must be suited to safely absorb and hold the load forces in the relevant direction.

Load-bearing parts may not be stressed by bending or gravitational forces, in addition to their load.

All load-bearing elements may only be stressed as designed.

Load control

Loads must be rigged to remain secure and stable during the entire lifting procedure. Loads must be securely slung and rigged to ensure stability through the whole lift path. Weight of the load must be taken slowly (pinched) to avoid shock loading. Separating integrated loads in the lifting process is prohibited. The HSE recommends the use of tag lines to keep control of the load throughout its path.

Shock loads must absolutely be avoided!

Rigging

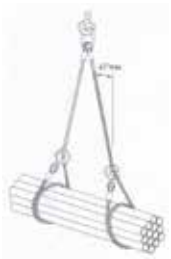
The rigger is responsible for selecting the proper rigging for transportation. The following must be considered:

- Weight of the load
- Centre of gravity of the load
- Slinging angles
- Secure connections at the suspension points
- Features of the load (sharp edges, temperature, etc.)
- Properties and load-bearing capacity of the slings
- Stress on the load due to the type of rigging
- Environmental impacts

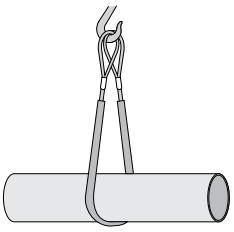
The load must be securely supported and stable at all times.

Basket hitch

Long, slender loads must not be rigged using single leg slings. When basket hitching with multi-leg slings, ensure that the legs of the slings cannot slip when under load.



Slings must not slip



Slender loads are unstable in single leg slings

Choker hitch

Reduce the lifting capacity of slings to 80% when choker hitching.

WLL.: 80%

Inspection and maintenance

All load lifting apparatus must be checked for visible defects prior to use, to guarantee its safe condition. All load lifting apparatus must also be tested at least once a year. Refer to notes and instructions provided in relevant operating manuals and applicable guidelines and regulations in this respect.
Damaged slings must be removed from service immediately to prevent further use.
Only qualified persons may be authorised to test slings.
All **load lifting machines** which are ready for commissioning at delivery were subjected to a static load test prior to delivery.
Manually operated load lifting machines were tested at 1.5 times their lifting capacity.
Powered load lifting machines were tested at 1.25 times their lifting capacity.

CERTEX **load lifting apparatus** in terms of the Machinery Directive are designed to pass a static test at 2 times their lifting capacity.

Your CERTEX advisers will gladly assist you with further information and advice.

Safe use and purpose of chain slings

Designated use
Detachable fasteners for lifting and rigging of loads, with up to 20 000 load cycles, when used in accordance with their technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions for commissioning, operation, maintenance and testing.
Any other use, especially lifting of persons, lifting of loads over persons, exceeding the specified lifting capacity and operation by untrained staff is deemed improper.

Notes on general use

- Do not attach loads to twisted chain legs.
- Use only special chain shortening links where necessary.
- Knotting of chains is prohibited.
- Protect the chain by padding (timber scantling/edge protection) when lifting sharp-edged loads.
- Carry the load on the bed of the hook, not its tip.
- Hook empty load hooks into the master link during transportation.
- Ensure that the master link moves freely in the crane hook.
- Replace damaged accessories.
- Never overload chains, observe slinging angles; when in doubt, always select a stronger chain.
- Authorise only qualified persons to use or maintain chain slings.
- Heat treatment and welding work on chain slings may only be performed by the manufacturer.

 Improper use may endanger life and health.

Applied standards
BS EN 818-2 "Short Link chain for lifting purposes."
BS EN 1677 "Components for slings."

Guidelines for use
Safe use of lifting equipment. Lifting Operations and Lifting Equipment Regulations 1998
Certex Instructions for safe use of chain slings

Basic rules

a) Visual inspection of the chain sling before first use
Before using a chain sling for the first time, ensure that:

- The chain sling is suitable and strong enough and marked with the correct W.L.L. for the task at hand.
- Current Thorough Examination Certificate and Declaration of Conformity (DEC) is at hand.
- All information on the chain sling corresponds with the information on current Thorough Examination Certificate and the Declaration of Conformity.
- all the chain sling details are entered in the register.

Always before use: visually check the chain sling for obvious damage or signs of wear. (Refer to Care and Maintenance)

Damaged chain slings must be removed from service immediately to prevent further use!

b) Handling the load preparation

 Check whether special instructions are given for load handling.
Before starting to lift, ensure that the load moves freely and is not anchored or otherwise attached.

Load mass

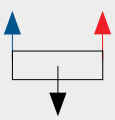
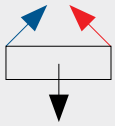
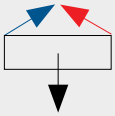
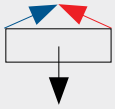
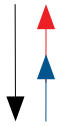
To select the appropriate sling, establish the weight of the load by weighing, by calculation or by reference to the shipping documents. Never just estimate the weight of the load!

The centre of gravity of the load must be known in order to correctly calculate the length and lifting capacity of the slings. If the centre of gravity is in the middle, the required length of the slings is calculated from the load dimensions and the selected slinging method. If the centre of gravity is off the geometric centre, the single-leg sling lengths must be individually matched.

Always position the crane hook above the centre of gravity of the load.

Observe the slinging angle ß! The greater the slinging angle, the smaller the lifting capacity.

Slinging angles › 60° are not permitted!

Slinging angle	0° (to max. 6°)	up to 45°	45° to 60°	over 60°
				
Parallelogram of forces	 ß=0°	ß = 45°	ß = 60°	ß= 80°

	Single leg		Two legs				3 and 4 legs		3 and 4 legs	
Slinging angle ß	**0**	**0**	**0 - 45°**		**0 - 60°**		**0 - 45°**		**0 - 60°**	
Load factor	**1**	**1**	**1.4**		**1**		**2.1**		**1.5**	
Nominal chain thickness	**G 8**	**G 10**	**G 8**	**G 10**	**G 8**	**G 10**	**G 8**	**G 10**	**G 8**	**G 10**
6	1120	1400	1600	2000	1120	1400	2360	2940	1700	2100
7	1500	1900	2120	2650	1500	1900	3150	4200	2240	2850
8	2000	2500	2800	3550	2000	2500	4250	5300	3000	3750
10	3150	4000	4250	5600	3150	4000	6700	8400	4750	6000
13	5300	6700	7500	9500	5300	6700	11200	14000	8000	10000
16	8000	10000	11200	14000	8000	10000	17000	21200	11800	15000
18	10000	12500	14000	17500	10000	12500	21200	26000	15000	18500
19	11200	14000	16000	20000	11200	14000	23600	30000	17000	21000
20	12500	15000	17000	21250	12500	15000	26500	33000	19000	23000
22	15000	19000	21200	26500	15000	19000	31500	40000	22400	28500
23	16000	21000	22400	29500	16000	21000	35500	44000	24000	31500
26	21200	27000	30000	38000	21200	27000	45000	57000	31800	40500
32	31500	40000	45000	56000	31500	40000	67000	85000	47250	60000

Centre of gravity of the load

The position of the load's centre of gravity must be determined in relation to the possible suspension points of the chain sling. To lift the load without it twisting or toppling, observe the following:

- With single-leg chain slings and endless basket chain slings, the suspension point should be vertically above the centre of gravity.
- With two-legged chain slings, the suspension points should be above and on two sides of the centre of gravity.
- With three- and four-legged chain slings, the suspension points should be uniformly distributed at one level around the centre of gravity. This arrangement should preferably be uniform and the suspension points should be positioned above the centre of gravity.

Use in hostile environments

Ambient temperature.

Remaining lifting capacity in %, as a function of chain temperature:

Ambient temperature	Lifting capacity
- 40°C to + 200°C	100%
+ 200°C to + 300°C	90%
+ 300°C to + 400°C	75%

Grade 8 chain slings may only be used up to a max. temperature of 400 degrees. Grade 10 chain usage temperatures acc. to manufacturer's specifications.

Please consult your CERTEX adviser if you need to use chain slings at temperatures below - 40°C.

Effects of acids

Grade 8 chain slings should neither be used in acids nor be exposed to acid vapours. Take note that certain production processes release acids or acid vapours.

Please contact your Certex adviser for information on the safe use of chain slings in aggressive environments.

Chain slings may neither be hot-dip galvanised nor subjected to any other galvanising treatment without the manufacturer's approval.

Care and maintenance

Visual inspection
Chain slings are exposed during use to conditions which may reduce their safe working ability. Ensure, therefore, that the chain slings are in a safe working condition.

The chain slings must immediately be removed from service for maintenance and repairs, if the following defects occur:

a) Illegible markings (identification and / or lifting capacity specifications) on the chain sling
b) Deformation of links on the hook or load sides
c) Stretched chain
d) Restricted movement of the chain links
e) Wear
f) Cuts, indentations, grooves, incipient cracks, excessive corrosion, bent or twisted links or other faults
g) Signs of widening hooks, i.e. noticeably wider jaw opening or other deformations in the hook end

Inspection

An inspection should be carried out every 6 months by a competent person. Additional inspections may be required in the interim, depending on the operating conditions.

Inspection results must be retained.

Chain slings must be thoroughly cleaned, i.e. oil, dirt and rust must be removed prior to inspection. Any cleaning method is allowed that does not affect the basic material. Processes which might result in hydrogen embrittlement, overheating, material ablation or movement should be avoided, as well as processes which may hide cracks or surface damage.

The chain sling should be checked for wear, deformation or external damages along its entire length.

Storage

Chain slings that are not in use should be stored in a frame designated for the purpose. Do not leave chain slings lying on the floor after use, to prevent damage occuring.
Hook the chain hook into the master link when leaving the empty chain slings hooked on the crane.

Clean, dry and protect chain slings from corrosion if they are not expected to be in use for a longer period (e.g. lubricate lightly).

Operating instructions for swivel hoist ring




Application Assembly Safety

Use swivel hoist ring only with a ferrous metal (steel, iron) or soft metal (i.e., aluminum) load (workpiece). Do not leave threaded end of hoist ring in aluminum loads for long time periods due to corrosion.
For subsea or marine environment applications, use the HR-1000CT series Hoist Ring only.

•After determining the loads on each hoist ring, select the proper size hoist ring using the Working Load Limit ratings in Tables 1, 2, 3, 6 and 7 for UNC threads and Tables 5 and 8 for Metric threads (on next page).
•Drill and tap the workpiece to the correct size to a minimum depth of one-half the threaded shank diameter plus the threaded shank length. See rated load limit and bolt torque requirements imprinted on top of the swivel trunnion (See Table 1 through Table 8 on next page).
•When a hoist ring is used in a side load application, ensure equal loading on the pins by aligning the bail as shown in (Fig. 4).
•Always be sure total hoist ring bushing mating surface is in contact with the (workpiece) surface. Drilled and tapped hole must be 90 degrees to load (workpiece) surface.
• Install hoist ring to recommended torque with a torque wrench making sure the bushing flange meets the load (workpiece) surface.
•Never use spacers between bushing flange and mounting surface.
• Always select proper load rated lifting device for use with Swivel Hoist Ring.
• Attach lifting device ensuring free fit to hoist ring bail (lifting ring) (Fig. 1).
• Apply partial load and check proper rotation and alignment. There should be no interference between load (workpiece) and hoist ring bail (Fig. 2).
• Special Note: When a Hoist Ring is installed with a retention nut, the nut must have a full thread engagement and must meet one of the following standards to develop the Working Load Limit (WLL).

UNC NUTS
ASTM A-563
Grade D
(Heavy Hex or Hex Thick) Grade DH
Grade DH3

ASTM A-194
Grade 2
Grade 4
Grade 7
3.FNL
Grade 9
4. SAE J995
Grade 8

METRIC NUTS
1.ASTM A-563M
Class 10S
2. ISO 898-2
(EN 20898-2/DIN 267-4)
Class 10
Class 12

Inspection / Maintenance

Always inspect hoist ring before use.
Regularly inspect hoist ring parts (Fig.3).
Never use hoist ring that shows signs of corrosion, wear or damage.
Never use hoist ring if bail is bent or elongated.
Always be sure threads on shank and receiving hole are clean, not damaged, and fit properly.
Always check with torque wrench before using an already installed hoist ring.
Always make sure there are no spacers (washers) used between bushing flange and the mounting surface. Remove any spacers (washers) and retorque before use.
Prior to loading always ensure free movement of bail. The bail should pivot 180 degrees and swivel 360 degrees (Fig. 4).

⚠ Warning

Loads may slip or fall if proper Hoist Ring assembly and lifting procedures are not used.
A falling load may cause serious injury or death.
Install hoist ring bolt to torque requirements listed in tables 1, 2, 3, 4, 5, 6 & 7 for the HR-125, HR-1000, HR125C, HR-1000CT, HR-125M, HR-1000M and HR125W, SS-125 and SS-125M respectively.
Web sling HR-125W spool bolt must be securely tightened in place. The jam nut must then be securely tightened onto the connecting bolt, see Table 5, last column.
Read, understand and follow all instructions and chart information.
Do not use with damaged slings, chain, or webbing. For inspection criteria see
ASME B30.9.
Use only genuine parts as replacements.
HR-125C chain connecting pin must be properly secured with the locking pin into the clevis ear.
Before use, tighten bolt first, then tighten nut
(HR-125W).

Operating Safety

Never exceed the capacity of the swivel hoist ring, see Tables 1, 2, 3, 5 and 6 for UNC threads and Tables 4 and 7 for Metric threads. (See next page for tables.)
When using lifting slings of two or more legs, make sure the forces in the legs are calculated using the angle from the horizontal sling angle to the leg and select the proper size swivel hoist ring to allow for the angular forces.

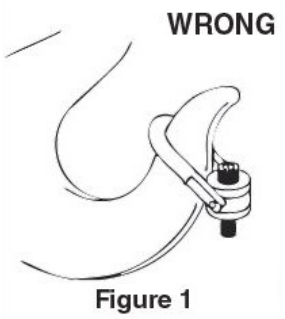


Figure 1

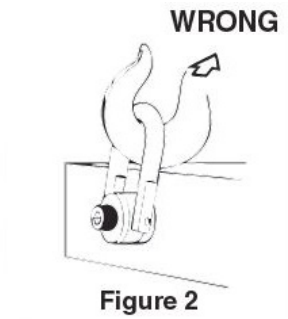


Figure 2

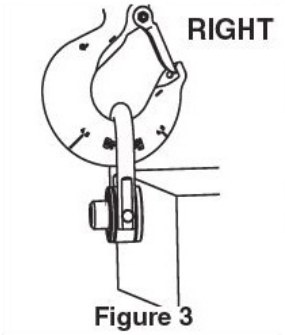


Figure 3

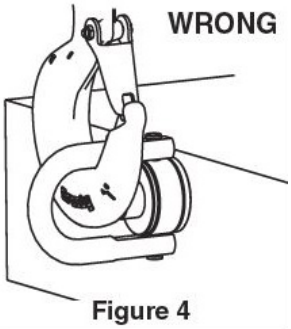


Figure 4

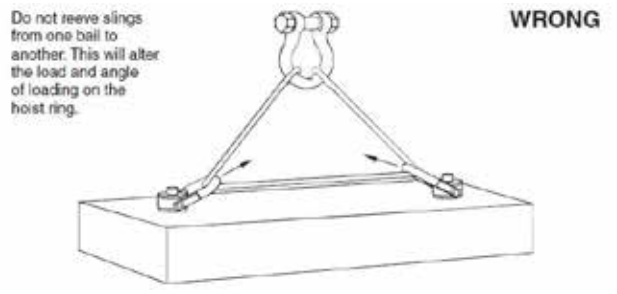


Figure 5

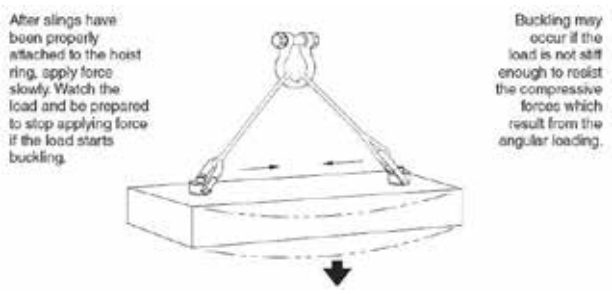


Figure 6

Operating instructions for suspension points

Warning and application instructions

Hoist Ring Application/Assembly Instruction

• The Crosby side pull swivel hoist ring is designed to accept standard Crosby fittings to facilitate wider slings and quick attachment. In order to use the larger fittings, the load rating on the (shackle) fitting may be greater than the hoist ring frame. Never exceed the Working Load Limit of the hoist ring frame.
• Use swivel hoist ring only with a ferrous metal (steel, iron) or nonferrous (i.e., aluminum) loads (workpiece). Do not leave threaded end of hoist ring in aluminum loads for long time periods due to corrosion.
• After determining the loads on each hoist ring, select the proper size hoist ring using the Working Load Limit ratings in Table 1 for UNC threads and Table 2 for Metric threads (on next page.)
• For Subsea or Metric environment application, use the HR-1200 CT Series Hoist Ring Only.
• Drill and tap the workpiece to the correct size to a minimum depth of one-half the threaded shank diameter plus the threaded shank length.
• Install hoist ring to recommended torque with a torque wrench making sure the bushing flange is fully supported by the load (workpiece) surface. See rated load limit and bolt torque requirements imprinted on hoist ring body (See Table 1 or Table 2).
• Never use spacers between bushing flange and mounting surface.
• Always select proper lifting device for use with Swivel Hoist Ring (See Tables 1 & 2 on next page).
• Attach lifting device ensuring free fit to hoist shackle (See Figure 3).
• Apply partial load and check proper rotation and alignment of shackle. There should be no interference between load (workpiece) and hoist shackle (See Figure 1 and Figure 3).
• The Hoist ring should rotate into normal operating position, with shackle aligned with load as shown in Figure 3. If shackle is oriented as shown in Figure 4, DO NOT LIFT.
• Special Note: when a Hoist Ring is installed with a retention nut, the nut must have full thread engagement and must meet one of the following standards to develop the Working Load Limit (WLL).
1. ASTM A-563 (A) Grade D Hex Thick
2. (B) Grade DH Standard Hex
3. SAE Grade 8 - Standard Hex

Hoist Ring Inspection / Maintenance

• Always inspect hoist ring before use.
• Regularly inspect hoist ring parts (Figure 2).
• For hoist rings used in frequent load cycles or on pulsating loads, the bolt threads should be periodically inspected by magnetic particle or dye penetrant.
• Do not use part showing cracks, nicks or gouges.
• Repair minor nicks or gouges to hoist frame by lightly grinding until surfaces are smooth. Do not reduce original dimension more than 10%. Do not repair by welding.

Warning

- Loads may slip or fall if proper Hoist Ring assembly and lifting procedures are not followed.
- A falling load may cause serious injury or death.
- Install hoist ring bolt to torque requirements listed in tables.
- The side pull hoist ring frame will be only one part of a lifting system with several components (i.e., shackles and slings). Never exceed the Working Load Limit of the hoist ring frame.
- Do not use damaged slings or chain. For inspection criteria, see ASME B30.9.
- Read and understand these instructions before using hoist ring.
- Use only genuine Crosby parts as replacements.

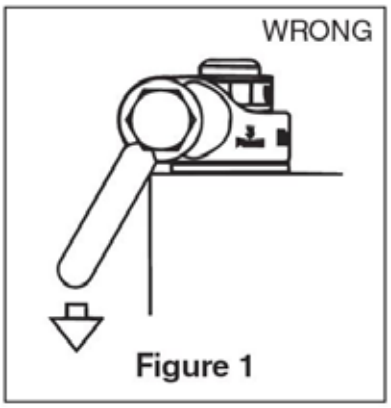


Figure 1

Figure 2

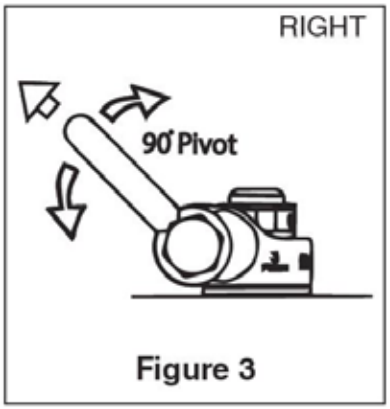


Figure 3

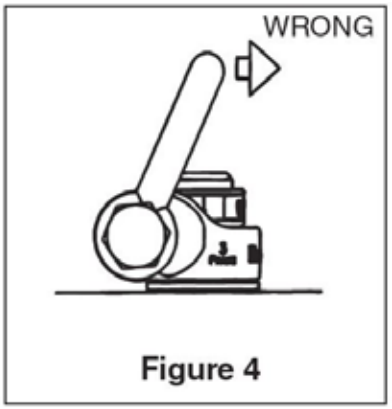


Figure 4

Never use hoist ring that shows signs of corrosion, wear or damage.

- Never use hoist ring if components are bent or elongated.
- Always be sure threads on bolt and receiving tapped holes are clean, undamaged, and fit properly.
- Always check with torque wrench before using an already installed hoist ring.
- Always make sure there are no spacers (washers) used between bushing flange and the mounting surface. Remove any spacers (washers) and retorque before use.
- Always ensure free movement of shackle. The shackle should pivot 90° and the hoist ring should swivel 360° (See Figure 3).
- Always be sure total workpiece surface is in contact with hoist ring bushing mating surface. Drilled and tapped hole must be 90° to load (workpiece) surface. Never exceed the capacity of the hoist ring, see Table 1 for UNC threads and Table 2 for Metric threads.
- When using lifting slings of two or more legs, make sure the forces in the legs are calculated using the angle from the horizontal sling angle to the leg and select the proper size swivel hoist ring to allow for the angular forces. Refer to figure 5 and 6 on the bottom of page 461.

Safe use and purpose of wire rope slings

Designated use

Detachable accessories for rigging and lifting of loads in accordance with their technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions for first use, operation, maintenance and testing.
Any other use, especially lifting of persons, lifting of loads over persons, exceeding the specified lifting capacity and operation by untrained staff is deemed improper.

Applied standards

European Machinery Directive (2006/42/EC) for all EU member states for compliance with the CEN standard
European standard BS EN 13414 - 1-3 Steel wire ropes slings. Safety. Slings for general lifting
European standard BS EN 12385-4:2002+A1:2008 Steel wire ropes. Safety. Stranded ropes for general lifting applications

Guidelines for use

Safe use of lifting equipment: Lifting Operations and Lifting Equipment Regulations (LOLER) 1998 Approved Code of Practice and guidance
Certex Safe Use of Wire Rope Slings

Basic rules

Prior to use, select the appropriate wire rope slings according to the planned rigging and the requisite lifting capacity (see Lifting capacity table).

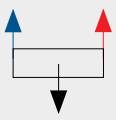
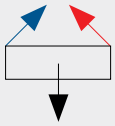
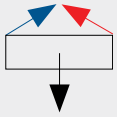
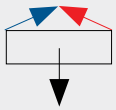
	Single leg			2 legs		3- and 4 legs	
							
Dia.	Direct	Basket	Choker				
Factor	1	2	0.8	1.4	1	2.1	1.5
mm	Lifting capacity in tons						
8	0.70	1.40	0.56	0.95	0.70	1.50	1.05
10	1.05	2.10	0.84	1.50	1.05	2.25	1.60
12	1.55	3.10	1.20	2.12	1.55	3.30	2.30
13	1.80	3.60	1.44	2.50	1.80	3.85	2.70
14	2.12	4.24	1.70	3.00	2.12	4.35	3.15
16	2.70	5.40	2.10	3.85	2.70	5.65	4.20
18	3.40	6.80	2.70	4.80	3.40	7.20	5.20
20	4.35	8.70	3.50	6.00	4.35	9.00	6.50
22	5.20	10.40	4.00	7.20	5.20	11.00	7.80
24	6.30	12.80	5.00	8.80	6.30	13.50	9.40
26	7.20	14.40	5.80	10.00	7.20	15.00	11.00
28	8.40	16.80	6.70	11.80	8.40	18.00	12.50
32	11.00	22.00	8.50	15.00	11.00	23.50	16.50
36	14.00	28.00	11.20	19.00	14.00	29.00	21.00
40	17.00	34.00	13.60	23.50	17.00	36.00	26.00

	Single leg			2 legs		3- and 4 legs	
							
Dia.	**Direct**	**Basket**	**Choker**				
Factor	**1**	**2**	**0.8**	**1.4**	**1**	**2.1**	**1.5**
mm			**Lifting capacity in tons**				
8	0.75	1.50	0.60	1.05	0.75	1.55	1.10
10	1.15	2.30	0.92	1.60	1.15	2.40	1.70
12	1.70	3.40	1.36	2.30	1.70	3.55	2.50
13	2.00	4.00	1.60	2.80	2.00	4.15	3.00
14	2.25	4.50	1.80	3.15	2.25	4.80	3.40
16	3.00	6.00	2.40	4.20	3.00	6.30	4.50
18	3.70	7.40	2.95	5.20	3.70	7.80	5.65
20	4.60	9.20	3.68	6.50	4.60	9.80	6.90
22	5.65	11.30	4.52	7.80	5.65	11.80	8.40
24	6.70	13.40	5.36	9.40	6.70	14.00	10.00
26	7.80	15.60	6.24	11.00	7.80	16.50	11.50
28	9.00	18.00	7.20	12.50	9.00	19.00	13.50
32	11.80	23.60	9.44	16.50	11.80	25.00	17.50
36	15.00	3000	12.00	21.00	15.00	31.50	22.50
40	18.50	37.00	14.80	26.00	18.50	39.00	28.00

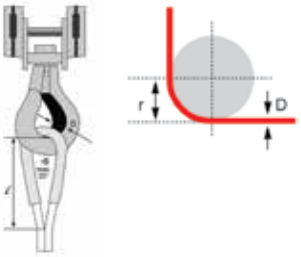
The centre of gravity of the load must be known in order to correctly calculate the length and lifting capacity of the slings. If the centre of gravity is in the middle, the required length of the slings is calculated from the load dimensions and the chosen rigging method. If the centre of gravity is off the geometric centre, the single leg sling lengths must be individually matched.
Important: always position the crane hook above the centre of gravity!

Attention: Observe the slinging angle (ß)! The greater the slinging angle, the smaller the lifting capacity.

Slinging angles › 60° are not permitted!

Slinging angle	**0° (to max. 6°)**	**up to 45°**	**45° to 60°**	**over 60°**
				
Parallelogram of forces	 ß=0°	ß = 45°	ß = 60°	ß= 80°
	Total lifting capacity = 100% of the individual lifting capacity x 2	Total lifting capacity = 70% of the individual lifting capacity x 2	Total lifting capacity = 50% of the individual lifting capacity x 2	Total lifting capacity = 17% of the individual lifting capacity x 2Use prohibited!

Instructions for use



- Wire rope slings must be without visible defects.
- Wire rope slings may not be knotted.
- Wire rope slings may not be pulled across sharp edges.
- Edge protection must be used for loads with sharp edges. An edge is considered sharp already if the edge radius (r) is smaller than the diameter of the sling (D).
- Rope end fittings (wire rope compression sleeves, splices etc.) must not be placed around the edges of the load or into the hook of the crane.
- Wire rope slings may not be distorted through twisting.
- No potentially damaging loads may be placed on wire rope slings.
- Wire rope slings must be rigged to prevent the load from falling.
- Rigging with basket hitch is not permitted. This excludes rigging of long, rod-shaped loads, provided tipping of the load, slipping of the slings and ejection of the load or parts thereof is prevented.
- Fittings must move freely after assembly.
- Wire rope slings must be rigged such that the opening angle of the end eye at the linking point does not exceed 20°.

Limitations of use

The lifting capacity must be reduced to 80% of nominal when using a choker hitch.

The use of slings in acidic environments is not recommended. Please contact the manufacturer for information.

The following table shows the permissible temperatures at which wire rope slings may be used, taking into account the type of rope termination.

Rope termination	Wire rope with	Surface temperature of the rope °C	Lifting capacity %
Aluminium compression sleeve	Fibre core	- 60 to + 100	100
	Steel core	- 60 to + 150	100
Splice	Fibre core	- 60 to + 100	100
	Steel core	- 60 to + 250+ 250 to + 400	10075
Superloop	Fibre core	- 60 to + 100	100
	Steel core	- 60 to + 250+ 250 to + 400	10075

Selecting the sling

Slings must be marked by the manufacturer. Marking must be permanent and legible and show the following:

- Lifting capacity
- Effective length
- Manufacturer
- Standard
- Year of Manufacture

Inspection, maintenance and care

Wire rope slings must be stored safe from the weather and aggressive substances. Wire rope slings may not be repaired.

Wire rope slings must be checked by a competent person at least every 6 months. Additional checks may be required in the interim, depending on operating conditions.
Wire rope slings must be monitored for visible defects when in use. Wire rope slings must be removed from service if they have the following defects:

- Bends and kinks (tangled loops)
- Broken strand
- Loose outer layer along the free length
- Pinching along the free length
- Pinching in the bearing surface of the eye, with more than 4 wire breakages in stranded ropes and more than 10 breakages on cable laid ropes
- Corrosion scars
- Damaged or heavily worn rope joint or termination
- Load hooks bent open
- Wire breakages as in the following table:

 Damaged rigging must be identified without delay and removed from service!

Type of rope	Number of visible wire breakages at discard condition over a length of		
	3 d	6 d	30 d
Stranded rope	4	5	16
Cable laid rope	10	15	40

General notes on hazards

Loads falling after failure of slings pose a direct or indirect hazard to the safety and health of persons in the danger zone during lifting.

- Where is the danger zone?
- Underneath the load
- Next to the load when lifting starts
- At elevated workplaces
- In the swing area of the load being lifted
- Between simultaneously lifted loads
- When hands remain between the load and rigging before lifting begins (crush hazard)

Safe use and purpose of wire rope grips

Designated use

Detachable fasteners for rigging and lifting of loads in accordance with their technical specifications and conditions of use. This also includes compliance with the manufacturer's instructions for first use, operation, maintenance and testing. Any other use, especially lifting of persons, lifting of loads over persons, exceeding the specified lifting capacity and operation by untrained staff is deemed improper.

Check the wire rope grips before use. Ensure that:

- Use only grips meeting EN 13411 - 5 for lifting
- all markings are clearly legible
- the wire rope grips do not exhibit any cracks, notches or other material defects
- the selected wire rope clip is of the correct size
- the wire rope clip has neither been repaired nor modified in any way.

Fitting wire rope grips

The wire rope clip must match the size of the wire rope. Refer to the relevant tables for details.

Always fit the saddle of the wire rope clamp to the load bearing side of the wire rope loop and the U-bolt of the clamp over the loose end (see Fig. 1-3).

Dimension the length of the looped back end of the rope such that a sufficient number of wire rope grips can be fitted in the prescribed manner.

As shown in Fig. 1, fit the first clamp over the folded back rope the width of a saddle from the end of the rope.

Then tighten the nut with the prescribed torque.

The second wire rope clamp is fitted directly adjacent to the thimble. It must, however, be positioned such that tightening does not damage the outer wires of the rope (Fig. 2). Tighten the nut but not yet with the prescribed torque.

The other grips are now fitted spaced at least 1.5 to max. 3 clamp widths (see Fig. 3).
Now tension the two rope strands slightly and evenly tighten the nuts at the prescribed torque

Wire rope diameter	Minimum no. of grips	Torque Nm
5	3	2
6.5	3	3.5
8	4	6
10	4	9
12	4	20
13	4	33
14	4	33
16	4	49
9	5	68
22	5	107
26	5	147
30	6	212
34	6	296
40	6	363

fig 1

fig 2

fig 3

The nuts must be checked and re-tightened at the required torque whilst fitting and each time before use. The grips must be re-torqued after the rope was stressed for the first time.

Notes

The torque must be checked at regular intervals. The torque must be checked every 10 000, 20 000 and 50 000 load cycles with heavy, medium and light loads respectively.

If the load cycles cannot be reliably counted, then the torque must be checked at fixed intervals, e.g. every 3 months, every 6 months or once a year.
Refer to the table for prescribed torques and the minimum number of wire rope grips to be used for a specific wire rope size.

The effectiveness of a wire rope termination depends essentially on the selection of the appropriate grips and their correct positioning and careful fastening. The rope end may slip through the wire rope grips if the nuts are not adequately torqued or if too few grips are used.
Several factors may impair the secure connection between grips and wire rope:

- Although the nut may be tight on the thread, it may not be tight enough on the saddle.
- Contamination of the threads with dirt or oil, or corrosion may impede proper tightening of the nut.
- Wire rope grips similar to BS EN13411-5 are suited for static loads and once-off lifting, applying an appropriate safety factor. This may only be performed by specialised staff, however.
- Wire rope grips may not be used on:
- hoisting ropes in mines
- crane ropes in steelworks and rolling mills
- permanent wire rope attachments in wire rope drives
- rope termination fittings used with lifting apparatus

Tackles designed for special applications are an exception here, however. The products must be checked regularly, at least in accordance with the standards of the country where they are used. This is necessary because the products in use may be deformed by wear and tear, incorrect use etc., potentially changing the characteristics of the material. The products should be checked by qualified staff at least every six months. More frequent checking is required if the products are subjected to unfavourable operating conditions.

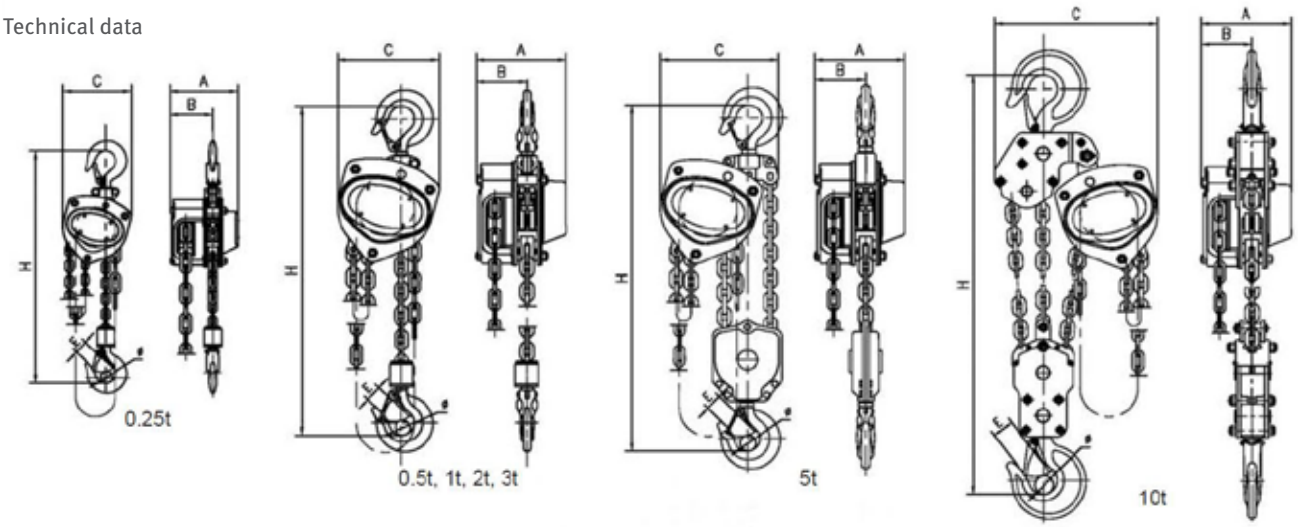
Instructions for use Chain Blocks (Powertex 0.25 - 10 tonnes)

General safety provisions

Read through these user instructions carefully before using the chain block.

- Check the function of the chain block before use. See “Daily checks” on the following pages.
- Full function of the brake system can only be secured at a minimum load of 30 kg for capacities (WLL) up to 1 ton, and for capacities (WLL) above 1 ton, the minimum load to be greater than 3% of the rated capacity (WLL).
- Do not exceed the maximum load.
- Handle the chain block with care. Do not throw the block about or let it fall to the ground.
- Do not use the chain block for welding work where it is exposed to welding spatter or current.
- The chain block must not be used for lifting persons.

Technical data



Model	PCB-S1	PCB-S1	PCB-S1	PCB-S1	PCB-S1	PCB-S1	PCB-S1
Max. Load Tonnes	**0.25**	**0.5**	**1**	**2**	**3**	**5**	**10**
Standard lifting height *) m	3	3	3	3	3	3	3
number of block falls	1	1	1	1	1	2	3
Pull on hand chain daN (kp)	19	21	29	36	41	40	54
Load Chain	4x12	5x15	6.3x19.1	8x24	10x30	9x27	10x30
Dimension A mm	106	128	142	175	195	183	195
Dimension B mm	68	75	76	88	95	90	95
Dimension C mm	108	130	150	185	226	255	355
Dimension Æ mm	18	20	25	33	36	43	44
Dimension E mm	20	22	26	35	37	43	47
Dimension H min mm	280	280	330	385	435	615	810
Weight for standard lift height kg	6.4	8.9	12	19.5	29.4	36.3	64.1

*) Length of hand chain varies according to lifting height.

Function
The load hook is raised or lowered by pulling on the hand chain. The load will remain where it is even when the hand chain is released because
of the effective reaction brake.

Suspension of chain block
Suspend the block from an eye, shackle, girder trolley etc. with sufficient load capacity. With the chain tightened, both hooks must be vertically
aligned.

⚠ **NB!** No bending stresses may be applied to block, hooks or load chain.

Raising/lowering
Only use straps and slings of sufficient load capacity. Check that the load is not anchored to the floor/ground or is otherwise fixed before making
the lift. Ensure that the load chain hangs vertically and has no kinks. The hand chain must also be in good condition and easily accessible. The
load is raised or lowered by pulling the hand chain in either direction.
Warning:
• Only hand power from a single person is permitted on the hand chain. If the chain feels too heavy, use a bigger chain block or reduce the
load.
• Make sure no-one stands beneath a hanging load.
• Do not step onto a hanging load.
• Do not raise or lower so far that the load hook hits the block housing.
• The chain block must not be used for pulling loads.
• The block must not be subjected to dynamic stresses, for example where a load connected to the block is launched from a height.
• Do not leave a block with a suspended load unattended.

Attachment of loads
Check the equipment before use. Improper attachment of loads can be highly dangerous (see Figs. 2 a – 2 e).

Fig 2 a
The sling is applying load to the hook tip

Fig 2 b
Excessive top angle on sling!
α max 60°

Fig 2 c
Hook latch obstructed

Fig 2 d
Hook tip subject to additional bending stress

Fig 2 e
Load chain must not be used as a sling

Combined lifts
Combined lifts present special risks. This is where two or more chain blocks are used simultaneously on the same load. Danger to persons and
risk of material damage can arise through dynamic stresses and uneven load distribution causing overload on individual blocks. Combined lifts
must therefore be supervised by a competent person with experience in this type of lift.
Daily checks
After every working day on which the chain block has been used, the following should be checked:
• Is the chain block deformed or otherwise damaged? Are any parts missing?
• Is any deformation or other damage visible on the suspension device (eye, shackle, bolt, trolley etc.)?
• Are the hooks intact or have any hooks opened? Are the hook latches correct and functional?
• Wipe down the chain block and oil the load chain as required.
• The load chain must be undamaged, i.e. no signs of wear and no deformed or otherwise damaged links.
• The load chain must not be kinked or twisted. With two-fall or multi-fall chain blocks there is a risk of the chain twisting if the **bot-**

tom hook
assembly ends up looped through the chain sling – usually during refitting or moving the chain block between work stations. See Fig 3.

- The hand chain must also be in good condition.
- The brake function must be intact.

In the event of faults or failures, the block must be repaired and carefully checked by a specialist before reuse.

Continuous maintenance - lubrication

Oil the hook latches and bearings. Grease the pawl and ratchet and also the gear. Lubrication must be sparingly and carefully applied so no grease
gets on the brake disk. Oil the load chain for longer life.

Periodic checks

Periodic checks are normally carried out yearly to detect and remedy any faults. If required (e.g. high frequency of use), more frequent checks
may be carried out. See “Checklist for periodic checks”. Measure hooks and chain to detect any changes in shape.

Checks on load hook (see Fig. 4 and Table 1)

Opening dimension l on the hooks is important. A hook with too large a maximum dimension has been exposed to overloading or overheating. It therefore does not have the necessary load capacity. The hooks may also have been exposed to long-term wear (dimension K).

Hooks must be discarded and replaced if:

- The maximum l value is exceeded (according to Table 1)
- The minimum K value falls short (according to Table 1)
- The hook shows signs of cracking
- The hook is deformed or otherwise damaged

Defective hooks must be replaced before using the chain block again.

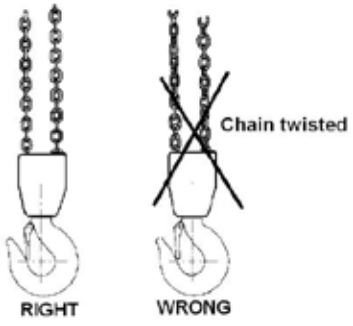


Fig. 3 The chain must not be twisted

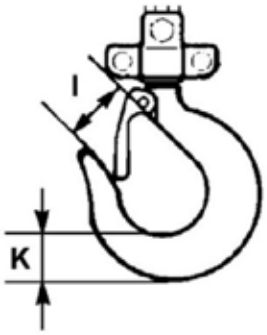


Fig. 4 Load hook

Table 1 Load hook

Max. load t	**0.25**	**0.5**	**1**	**2**	**3**	**5**	**10**
Model	PCB-S1	PCB-S1	PCB-S1	PCB-S1	PCB-S1	PCB-S1	PCB-S1
Dimension l nominal mm	24	25.5	30	38.5	41.5	47	55
Dimension l max mm	26.4	28.0	33	42.3	45.5	51.7	60.5
Dimension K nominal mm	15	19	25	33.5	39	44.5	62
Dimension K min mm	13.5	17.1	22.5	30.2	35.1	40.0	55.8

Checks on load chain (see Fig. 5 and Table 2)

Inspect the load chain over its whole length to detect any deformed or otherwise damaged links. Make a check measurement of suspect links.

Measure the worn areas Also, every 300 mm (normally), make check measurements of the internal length of 5 links (pitch dimension 5xP – according
to Table 2).

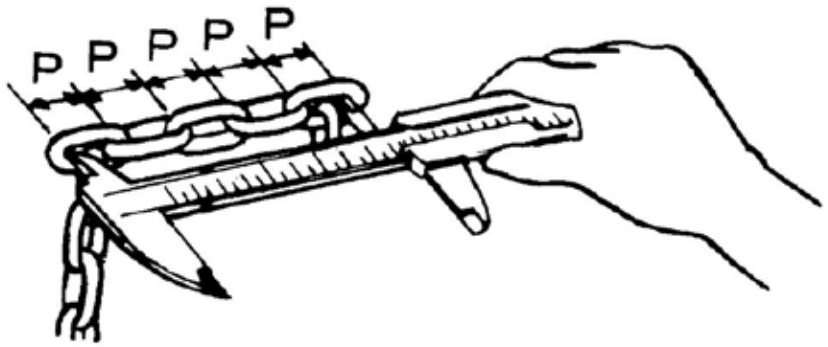


Fig 5 Checking chain dimensions

Table 2 Load Chain

Max. load t	**0.25**	**0.5**	**1**	**2**	**3**	**5**	**10**
Model	PCB-S1	PCB-S1	PCB-S1	PCB-S1	PCB-S1	PCB-S1	PCB-S1
Link Diameter nominal mm	4	5	6.3	8	10	9	10
Link diameter min. mm	3.6	4.5	5.7	7.2	9	8.1	9
Pitch dimension (5xP) nominal mm	60.0	75.0	95.0	120.0	150.0	135.0	150.0
Pitch dimension (5P) max. mm	61.8	77.2	98.0	123.5	154.5	139.0	154.5

The load chain must be discarded and replaced if:

- cracks are detected on any link
- any link is deformed or otherwise damaged
- The minimum value of any link's diameter falls short
- the maximum value of the pitch dimension is exceeded at any point
- the chain is damaged by overheating or has been affected by weld splatter

Load chains must not be repaired – they must be replaced by new chain. If it is desired to lengthen the chain, it must be replaced by a new and
longer chain.
Replacement of the chain shall be performed professionally by an authorized repairer and the chain must meet the requirements stated in the
standard EN 818-2 from the following manufacturers: Chaineries Limousines, Pewag, Thiele or Rud.
Repairs
The chain block must not be modified. Repairs must be carried out by specialists. Damaged parts must only be replaced with original Powertex
spare parts. Order them through your dealer.

Daily	Yearly	Inspection Items	Inspection Method	Note
Labels				
X	X	Rating plate	Visual	If the plate is to hard to read - replace it.
Function				
X	X	Raising and lowering-function	Test without load	A low snapping noise should be audible.
-	X	Raising and lowering function	Tesat with rated weight for min 300 mm	Load chain sprocket and chain, check they work well together. Brake works. Hand pulling on the hand chain feels even and not too heavy.
Hooks				
X	X	Hook opening	Visual Measurements	Looks normal See Fig. 4 and Table 1
X	X	Deformation	Visual	No visible deformation
	x	Hook bearing	Visual	No abnormal play
x	x	Wear, cracks, deformation and corrosion	Visual Measurements	No visible damage See Fig. 4 & table 1
	X	Hook bearing	Visual	No abnormal play
Load chain				
X	X	Pitch	Visual Measurement	Looks normal. Measure in case of doubt See Fig. 5 and Table 2
X	X	Wear	Visual Measurement	Looks problem-free. Measure in case of doubt See Fig. 5 & Table 2
X	X	Deformation	Visual	No deformation. Measure in case of doubt.
X	X	Cracks etc.	Visual	No Cracks
X	X	Rust	Visual	No rust
Housing				
X	X	Frame	Visual	No deformation and no rust
X	X	Gearbox	Visual	No deformation

Daily	Yearly	Inspection Items	Inspection Method	Note
-	X	Gears	Visual after dismantling	No serious wear or fractures
-	X	Load chain sprocket	Visual after dismantling	No serious wear or cracks. No fractures or deformation.
-	X	Hand chain sprocket	Visual	No serious wear or cracks. No fractures or deformation.
-	X	Bearings	Visual, testing	No damage, smooth running
Screws				
	X	Screws, nuts, rivets, cotters etc.	Visual	Must not be missing. Tighten loose items. Replace as necessary.
Brakes				
-	X	Brake disk	Visual	Replace if worn
-	X	Brake screw	Visual	No serious wear
-	X	Pawl and ratchet	Visual	Replace worn parts. Carefully lubricate with grease.

Instructions for use Lever Hoist (Powertex PLH-S1 0.25 - 6)

General safety provisions

Read through these user instructions carefully before using the lever hoist.

• Check the function of the lever hoist before use. See “Daily checks” on the following pages.
• Do not exceed the maximum load.
• Full function of the brake system can only be secured at a minimum load of 30 kg for capacities (WLL) up to 1 ton, and for capacities (WLL)
above 1 ton, the minimum load to be greater than 3% of the rated capacity (WLL).
• Handle the lever hoist with care. Do not throw the hoist about or let it fall to the ground.
• Do not use the lever hoist for welding work where it is exposed to welding spatter or current.
• The lever hoist block must not be used for lifting persons.

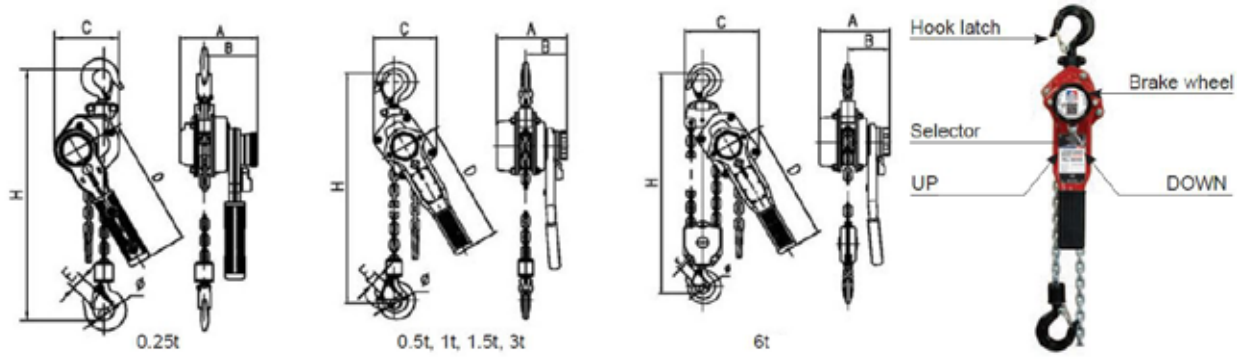


Fig. 1 Dimensioned sketch

Fig. 2 Description

Technical data

Model	PLH-S1	PLH-S1	PLH-S1	PLH-S1	PLH-S1	PLH-S1
Max. Load Tonnes	**0.25**	**0.5**	**1**	**1.5**	**3**	**6**
Lifting height m	1	1.5	1.5	1.5	1.5	1.5
Number of falls	1	1	1	1	1	2
Force on lever på daN (kp)	12	25	29	32	36	37
Load chain mm	4x12	5x15	6x18	7.1x21.2	10x28	10x28
Dimension A mm	100	150	156	186	208	208
Dimension B mm	70	90	95	112	120	120
Dimension C mm	86	118	138	145	198	230
Dimension D mm	158	253	278	378	388	388
Dimension Ø mm	18	20	25	30	36	43
Dimension E mm	20	22	26	29	37	43
Dimension H min mm	280	280	330	385	435	615
Weight kg	2.3	5.3	8.1	11.2	20.5	29.5

Function (see Fig. 2)
Loads may be raised or lowered using the lever, depending on the position of the selector in UP or DOWN (U/D). The load will remain where it
is even when the lever is released because of the effective reaction brake. Unloaded chains can be pulled through the block with the selector in
neutral position (N) (on this, see below).
Pulling through the unloaded chain (see Fig. 2)
Make sure the chain is unloaded and set the selector to neutral position (N). Pull the chain through by hand to the desired position.

⚠ **Warning!** If the selector is in position UP or DOWN when the chain is pulled, the lever may rotate like a propeller, which can pose a hazard.
⚠ **Warning!** If the lever hoist is used on a load which is too light, the brake function will not engage. The load must be at least 3% of
maximum load. For example a minimum load of 30 kg is necessary to engage the brake on a 1 tonne hoist. For lightloads choose a smaller lever hoist.

If it proves impossible to pull the chain through despite the selector being in neutral, it may be necessary to release the brake first, by turning the
brake wheel anti-clockwise. If this does not help, set the selector to position DOWN, load the chain slightly and jerk the lever in clockwise direction.
Then try again without load but with the selector in neutral.

Suspension of lever hoist
Make sure the hoist in suspended from an eye, shackle or similar with sufficient bearing capacity. With the chain tightened, both hooks must be in line (Fig. 3a).
⚠ **NB!** Neither hoist, hooks nor chain may be subjected to bending stresses (Figs. 3b and c and Fig. 4).

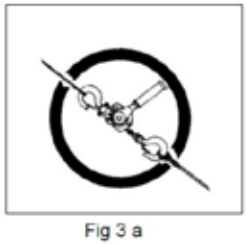


Fig 3 a


Fig 3 b


Fig 3 c

Attachment of loads
Check the equipment well before use. Improper attachment of loads can be highly dangerous (see Figs. 4 a–e).
Only use straps and slings of sufficient load capacity. Make sure the load is not anchored to the floor/ground or is otherwise fixed before making the lift.

Lifting/pulling
With the selector in position UP, operate the lever to tighten the chain. Check for safety before lifting the load to the desired position. If the load is too light to be lifted, hold onto the brake wheel so you hear the snapping sound. You will then be able to lift the load with just one hand. If the lever is released while lifting, the load will be held in its current position by the reaction brake. The lever hoist can also be used for pulling and fixing loads.

Fig 4 a
The sling is applying load to the hook tip!

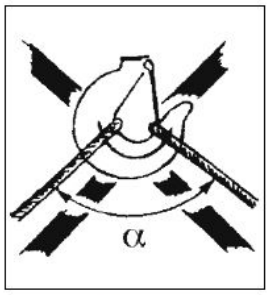


Fig 4 b
Excessive top angle on sling!
α maks. 60°

Fig 4 c
Hook latch obstructed!

Fig 4 d
Hook tip subject to additional bending stress!

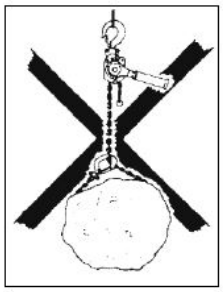


Fig 4 e
Load chain must not be used as a sling!

Further safety precautions

• Never lengthen the lifting lever with a pipe or similar. Use only hand power on the lever. If the load seams too heavy, use a bigger lever hoist or reduce the load.
• Make sure no-one stands beneath a hanging load.
• Do not raise or lower so far that the load hook or the stop eye hits the block housing.
• Do not set the selector to neutral under load.
• The block must not be subjected to dynamic stresses, for example where a load connected to the block is launched from a height.
• Do not leave a block with a suspended load unattended.

Lowering
With the selector in DOWN position, operate the lever to lower the load. Wait until the chain has been completely freed of load before moving the selector to Neutral (N) to rapidly pull out the chain. (See “Pulling through the unloaded chain” page 2).

Combined lifts
Combined lifts present special risks. This is where two or more lever hoists are used simultaneously on the same load. Danger to persons and risk of material damage can arise through dynamic stresses and uneven load distribution causing overload on individual blocks. Combined lifts must therefore be supervised by a competent person with experience in this type of lift.

Daily checks
After every working day on which the lever hoist has been used, the following should be checked:

• Is the lever hoist deformed or otherwise damaged? Are any parts missing?
• Is any deformation or other damage visible on the suspension device (eye, shackle, bolt or similar)?
• Are the hooks intact or have any hooks opened? Are the hook latches correct and functional?
• The selector must work without problems.
• Wipe down the lever hoist and oil the chain as required.
• The chain must be undamaged, i.e. no signs of wear and no deformed or otherwise damaged links.
• The chain must not be kinked or twisted. With 2-fall lever hoists (6 t), there is a risk of the chain twisting if the bottom hook assembly ends up looped through the chain sling – usually during refitting or moving the hoist between work stations. See Fig 5.
• The chain stop must free of deformation or other damage.
• The brake function must be intact..

In the event of faults or failures, the hoist must be repaired and carefully checked by a specialist before reuse.

Continuous maintenance - lubrication
Oil the hook latches and bearings. Grease the pawl and ratchet and also the gear. Lubrication must be sparingly and carefully applied so no grease gets on the brake disk. Oil the chain for longer life.

Periodic checks
Periodic checks are normally carried out yearly to detect and remedy any faults. If required (e.g. high frequency of use), more frequent checks may be carried out. See “Checklist for periodic checks”. Measure hooks and chain to detect any changes in shape.

Hook checks (see fig 6 and Table 2)
Opening dimension l on the hooks is important. A hook with too large a maximum dimension has been exposed to overloading or overheating. It therefore does not have the necessary load capacity. The hooks may also have been exposed to long-term wear (dimension K).
Hooks must be discarded and replaced if:
• the maximum I value is exceeded (according to Table 2)
• the minimum K value falls short (according to Table 2)
• the hook is cracked, deformed or otherwise damaged.
Defective hooks must be replaced before using the lever hoist again!

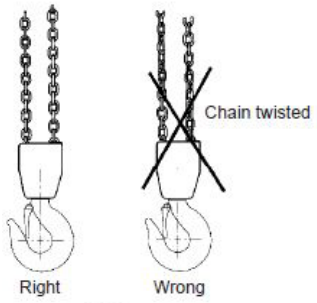


Fig 5

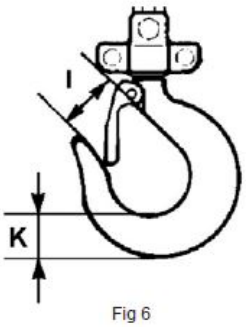


Fig 6

Table 2 Hook Dimensions

Max. load tonnes	**0.25**	**0.5**	**1**	**1.5**	**3**	**6**
Model	PLH-S1	PLH-S1	PLH-S1	PLH-S1	PLH-S1	PLH-S1
Dimension I nominal mm	24	25.5	30	33	41.5	47
Dimension I max. mm	26.4	28	33	36.3	45.6	51.7
Dimension K nominal mm	15	19	25	30	39	44.5
Dimension K min mm	13.5	17.1	22.5	27.0	35.1	40.0

Check measurement of chain (See Fig. 7 and table 3)
Inspect the chain over its whole length to detect any deformed or otherwise damaged links. Make a check measurement of suspect links. Measure the worn areas Also, every 300 mm (normally), take check measurements of the internal length of 5 links (pitch dimension 5xP according to Table 3).

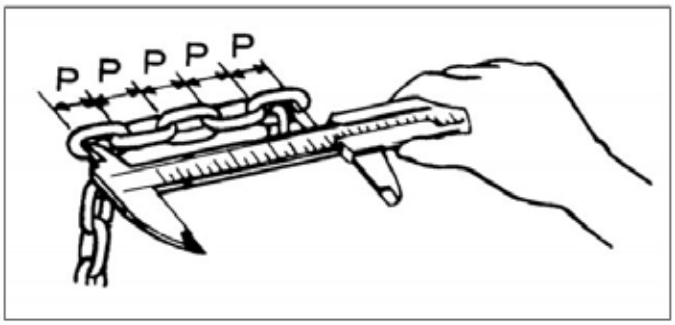


Fig 7 Checking chain dimensions

Table 3 Chain dimensions

Max. load tonnes	**0.25**	**0.5**	**1**	**1.5**	**3**	**6**
Model	PLH-S1	PLH-S1	PLH-S1	PLH-S1	PLH-S1	PLH-S1
Link diameter nominal mm	4.0	5.0	6.0	7.1	10.0	10.0
Link diameter min. mm	3.6	4.5	5.4	6.4	9.0	9.0
Pitch dimension (5xP) nominal mm	60.0	75.0	90.0	105.0	140.0	140.0
Pitch dimension (5xP) max.mm	61.8	77.2	92.7	108.1	144.2	144.2

The chain must be discarded and replaced if:

• cracks are detected on any link
• any link is deformed or otherwise damaged
• The minimum value of any link's diameter falls short
• the maximum value of the pitch dimension is exceeded at any point
• the chain is damaged by overheating or has been affected by weld splatter
Chains must not be repaired – they must be replaced by a new original chain. If it is desired to lengthen the chain, it must be replaced by a new and longer chain. Replacement of the chain shall be performed professionally by an authorized repairer and the chain must meet the requirements stated in the standard EN 818-2 from the following manufacturers: Chaineries Limousines, Pewag, Thiele or Rud.
Repairs

The lever hoist must not be modified. Repairs must be carried out by specialists. Damaged parts must only be replaced with original Power**tex** spare parts. Order them through your dealer.
Checklist for periodic checks (normally yearly – more frequently if necessary)

Daily	Yearly	Inspection items	Inspection method	Note
Labels				
X	X	Rating plate	Visual	If the plate is hard to read, replace it.
Function				
X	X	Raising & lowering function	Test without load	A low snapping noise should be audible
-	X	Raising & lowering function	Try with 125% of rated load over a distance of min. 300mm.	The lever runs easily. Load chain sprocket and chain work well together & brake works. The chain doesn't twist/tangle. Hand pulling feels even.
X	X	Selector	Operation	Easy to reset
X	X	Neutral	Operation	Function
Hooks				
X	x	Hook opening	Visual Measurement	Looks normal See Fig. 5 & Table 2
X	-	Deformation	Visual	No visible deformation
X	X	Hook bearing	Visual	No abnormal play
X	X	Wear, cracks, deformation & corrosion	Visual Measurement	No visble damage. See Fig. 5 Table 2
X	X	Hook latches	Visual	Works, spring entire
Chain				
X	X	Pitch	Visual Measurement	Looks normal, measure if in doubt. See Fig. 7 & Table 3
X	X	Wear	Visual Measurement	Looks problem free, measure if in doubt. See Fig. 7 & Table 3
X	X	Cracks etc.	Visual	No cracks
X	X	Rust	Visual	No rust
Housing				
X	X	Housing	Visual	No deformation & no rust
-	X	Operating lever	Visual	No deformation
-	X	Load chain sprocket	Visual after dismantling	No serious wear or cracks. No fractures or deformation
-	X	Bearings	Visual testing	No damage, smooth running
-	X	Gears	Visual after dismantling	No serious wear or fractures
X	X	Chain stop	Visual	Must be free of deformation

Daily	Yearly	Inspection items	Inspection method	Note
X	X	Screws, nuts, rivets, cotters etc.	Visual	Must not be missing. Tighten loose items. Replace as necessary
Brake				
-	X	Brake disc	Visual	Replace if worn
-	X	Brake screw	Visual	No serious wear
-	X	Pawl and ratchet	Visual	Replace worn parts. Carefully lubricate with grease

Hand Pumps: Instructions for use & Maintenance (EUROPRESS)

While receiving: check for shipping damage and if any, notify a claim on the carrier.

SAFETY:

• Only trained personnel should operate the pumps.

• Provide an extra 25% tank capacity and do not refill while operating unless with cylinder plunger fully retracted in order to avoid possible explosion during retraction under load.

• Keep clear of the load when lifting.

• Connect the device to the pump with hoses and couplers suitable for the working pressure. Make sure the couplers are perfectly matched; serious damage can derive from overloading
or unpredicted motion due to the coupler blocking the flow.

• Do not alter the pressure settings.

USE:

• To build pressure: tighten manually CW the by-pass hand-wheel
and operate the lever.

• To release the pressure: gently unscrew the by-pass handwheel.

• For pumps with 4-way valve: select the position of the valve handle to extend or retract, then operate as above. For the retraction under load of double acting cylinders, first use the bypass
valve with the 4-way valve in “extend” position, then invert to retract completely.

• For pumps with vent and filler cap: unscrew one turn to vent the
tank. Screw tightly for transport.

• Gauge ports: many pumps are fitted with a ¼”NPT gauge port on the left side for gauges Ø63; screwed and flanged adapters are available for gauges with 1/2”BSP connection.

• The hand pumps are usable horizontally or head down.

• Carry the pump by the handle and do never force the lever at end of stroke up.

MAINTENANCE:

• The hand pumps must be repaired by a competent person.

• Change the oil at least once a year.

Hydraulic cylinders: Instructions for use & Maintenance (EUROPRESS)

While receiving: check for shipping damage and if any, notify a claim on the carrier.

SAFETY:

• Only trained personnel should operate the cylinders.

• Provide an extra 25% capacity in case of lifting operation.

• Keep clear of the load when lifting. Provide a mechanical stop for supporting the lifted load.

• Do not overload. Take into account possible passive overloading conditions: the retraction under load with several cylinders should possibly be done at the same time.

• Make sure the load is centred and that the cylinder is correctly placed and constrained. In case, use tilting saddles and provide enlarged base plates.

• Check the couplers are perfectly matched: serious damage can derive from overloading or unpredicted motion due to the coupler blocking the flow. Do not remove or tamper the safety valves on double acting cylinders.

• The tank of the pump must contain enough oil to completely extend the piston: in case, refill only with the piston completely retracted.

• Avoid shocks and heat beyond 80°C, use only original hydraulic oil.
• Do not use cylinders which appear damaged, do not weld, drill or alter the cylinders.
• To purge the air: position the cylinder lower than the pump, coupler facing up, extend and retract a few times the piston.
• Do not force against the end-of-stroke nut without load.
• A red ring on the plunging cylinders appears at 10 from the end of stroke. Do not over-travel.
• The load return cylinders need an external force to be retracted.
• The retraction speed is influenced by the hose length and restrictions on the line.

MAINTENANCE:

• The cylinders must be repaired by skilled personnel only,
authorised by EPP.
• While dismantling some cylinders, the preloaded retraction spring can shoot the stop nut out if not properly retained, with possible personal injury.
• In case of leaks under the spring fixing screws on spring return cylinders, simply tighten them with a proper Allen wrench.

Jacks: Operating & Safety Instructions (TANGYE)

Please read this instruction booklet carefully before operating the product and keep in a safe place for future reference.
It is the responsibility of the purchaser to ensure that operators are properly trained in the safe use of this equipment and have access to Tangye Operating and Safety Instructions.
No modification and/or additions may be made to this equipment without the written permission of the manufacturer.
It is expected that the product is used by competent technical personnel who have been properly trained to use hydraulic lifting equipment

Hydramite & Hydralite

Description

This equipment is provided for the purpose of lifting or lowering loads, or exerting a force, under the control of a trained operator.
The equipment is supplied completely assembled and ready for use. No service adjustments are necessary or possible during operation.
An internal safety relief valve (factory set) is fitted which limits the load that may be lifted to the equipment rated load + 10% maximum.

Before Each Use

• Ensure that the jack is in good condition.
• Check the external surfaces for absence of mechanical damage and/or oil leaks. If either is present do not use the equipment and have it serviced.
• Ensure that the external surfaces are dirt free.
• Check the oil level.

Operating Instructions

Place the jack on a firm level foundation fully supporting the jack base, and if necessary place suitable material between the load point and jack ram to avoid damaging the structure to be lifted.
Use the jack by operating the lever in a steady controlled movement at a maximum of 30 strokes per minute.
Remove the operating lever when not in use. ©Allspeeds Ltd

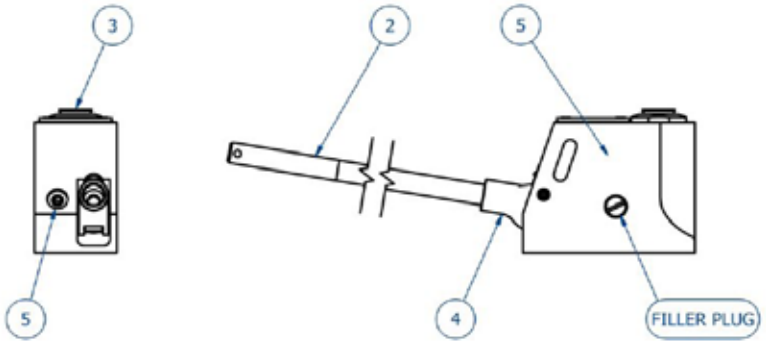
The ram should only be extended hydraulically; it should never be pulled out by hand or used to carry the jack.
Do Not position the jack by using the operating lever in the release valve. If the jack is to be placed some distance under the load, use the operating lever in the operating lever/quadrant socket to position the jack.
Do Not drop loads onto the jack. If the jack is inadvertently subjected to a shock load, remove from service and have it checked by a competent examiner or service agent.
Do Not overload the jack especially when lowering loads.
Do Not under any circumstances go under a load when hydraulic jacks solely support it.
If using more than one jack, all the jacks must be able to individually raise the load e.g. two PS620 jacks cannot be used to lift a 30T load as it impossible to pump both jacks at exactly the same rate, or lower the jacks at exactly the same rate, one of the jacks will end up with an excess load and is liable to fail. In such case two PS630 jacks should be used to raise a load of 30T.

Operating Environments

The jack is intended for use in industrial environments, inside or outside, between temperatures of –20 to +50°C. Outside these limits, or in explosive atmospheres/areas of nuclear radiation, consult the manufacturer before use.

Noise and Vibration
By its design, the jack operates slowly under manual effort. There is no noticeable noise or vibration.

Fig. 1



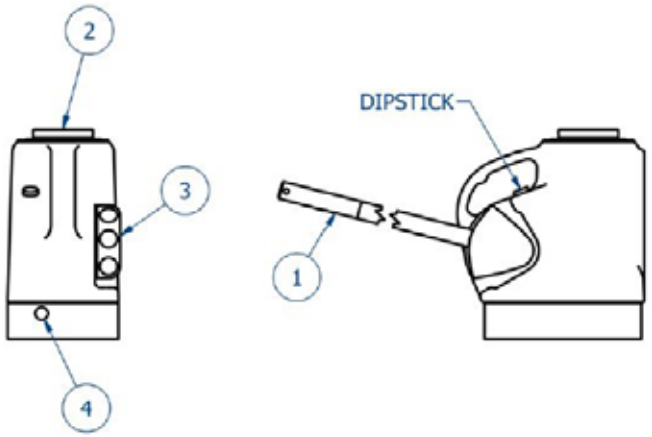
Hydramite

Function (read in conjunction with Fig. 1)
The permissible working load and the travel of the hydraulic jack are marked on the equipment.
The jack (1) has an in-built hydraulic pump, which is worked by means of an operating lever (2), under the control of the operator. The jack ram (3) is raised on each downward stroke of the lever. For lifting, the lever is placed fully into the operating socket (4).
For lowering, the lever is removed from the socket and placed into the release screw (5). Turning this anti-clockwise will allow the ram to descend. The amount this is rotated will control the speed of descent; only open a very small amount (approx. 5°) at first.
Close the release valve after use, to ready the jack for the next operation.

Operating Positions
The hydraulic system is sealed – the jack may be used in any mounting position.

Oil Level Check
Lay the jack on its side with the filler plug uppermost and remove the filler plug. There should be no airspace under the plug.
If oil needs to be added ensure that the surrounding area is clean and fill to the bottom of the plug threads. Use high quality hydraulic oil such as Shell Tellus ISO 32 or equivalent.

Fig.2



Hydralite

Function (read in conjunction with Fig. 2)

The permissible working load and the travel of the hydraulic jack is marked on the equipment, also see table 1.

The jack has an in-built hydraulic pump, which is worked by means of an operating lever (1), under the control of the operator. The jack

ram (2) is raised on each downward stroke of the lever. For lifting, the operating lever (1) is placed fully into the operating quadrant (3).

Three positions are provided to enable the operator to choose the best ergonomic position. For lowering, the lever is removed from the quadrant and placed into the release screw (4). Turning this anti-clockwise will allow the ram to descend. The amount this is rotated will control the speed of descent; only open a very small amount (approx. 5°) at first.

Close the release valve, to ready the jack for the next operation.

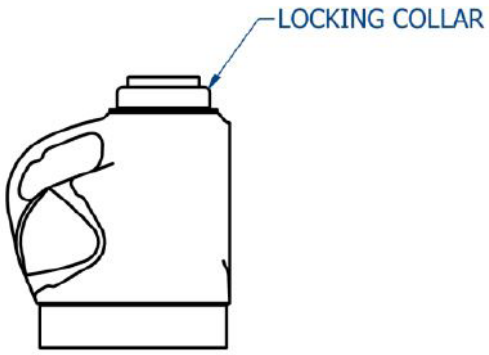
After use store the jack in an upright position with the ram fully retracted and the operating quadrant in the 'up' position.

Table 1

Model	Capacity (tonne)	Stroke (ins)	Claw Capacity (tonne)
PS620	20	6	8
PS1220	20	12	8
PS630	30	6	12
PS1230	30	12	12
PS660	60	6	24
PS1260	60	12	24
P6100	100	6	N/A

Add: S for Screwed Ram (for example PS620S)
C for Claw (for example PS620C)

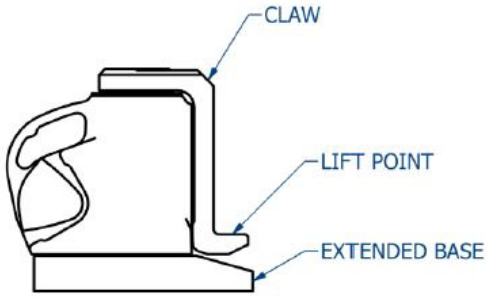
Jacks with Screwed Rams (Type S)



All models can be provided with screwed rams and locking collars. The purpose for this is to mechanically support a load at a required position without relying on the hydraulic circuit.
When the load is at the required position, rotate the locking collar clockwise until it rests hand-tight on the top of the jack body.
To undo – operate the jack so that the hydraulic circuit just takes the load off the locking collar. Rotate the collar anti-clockwise until it reaches the top of the ram.
Safety Note: Lifting claws must never be used with screwed ram jacks.

Jacks with Lifting Claws (Type C)

These claws are supplied as an accessory to provide a low height lifting point. When fitted, lifting must always, and only, be carried out



on the toe of the claw.

The capacity of the claw is 40% of the capacity of the jack to which it is fitted (See table 1), if the claw is overloaded it could snap and put the operator in danger. Jacks intended for use with claws have extended bases which prevent the jack from toppling over when a load is applied to the claw. Never attempt to use a claw on a jack without an extended base. They must only be used for vertical movements of loads.

The recess in the head of the claw fits around the ram top, and the heel of the claw rests against the front face of the jack. Ensure the claw is seated properly before use and also that the toe is as far under the load as possible.

100 Tonne Jacks Only

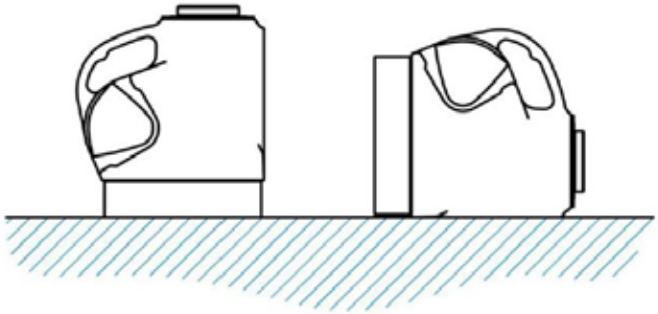
This jack is fitted additionally with a low pressure pump intended for faster movement of the ram under no load. i.e. to close daylight. The low pressure quadrant is on the left hand side of the jack and operates in the same manner as the high pressure pump.

Stroke Limit

The jack is fitted with an internal by-pass valve which prevents the ram stroke exceeding the design limit. If the jack is operated in this condition, oil passes back to the reservoir. If operation is continued, some oil may by-pass the ram scraper ring and appear on the top of the jack. Cease operating the jack, wipe off surplus oil and check the oil level of the jack.

Operating Positions

The jack should only be used in the positions shown below:

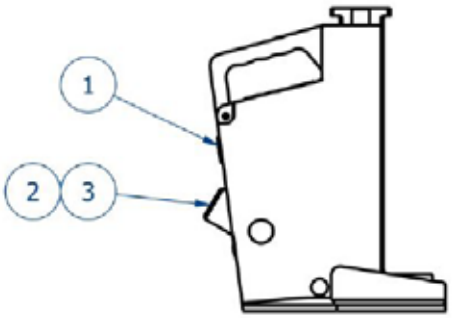


Oil Level Check

Remove the dipstick (see Fig. 1) and check the oil level. The maximum level is marked on the dipstick; the level should be within 5mm of this mark. The dipstick should be screwed fully into position to determine the level.

If oil needs to be added ensure that the surrounding area is clean. Use high quality hydraulic oil such as Shell Tellus ISO 32 or equivalent.

Hydraclaw



Description
The jack is constructed from high strength ferrous materials throughout. The forged claw is guided in the body to relieve the ram of bending loads.

Oil Level Check
The jacks are supplied filled and ready for use. However, before using the jack for the first time, the oil level should be checked. The oil used should be high quality hydraulic oil such as Shell Tellus ISO32 or equivalent.
To check the oil level, stand the jack on its base in an upright position, remove the filler plug and seal (1) and check that the oil is level with the bottom of the filler plug hole.

When refilling from empty, or if air is in the circuit, the following procedure should be observed:

Ensure that the release valve (2) located inside the operating socket (3) is open. With the jack standing on its base, fill with oil to the bottom of the filler plug hole, replace the filler plug and seal and close the release valve screw.

Pump the ram/claw to its full extent and turn the jack upside down. Whilst in the inverted position, open the release valve and apply pressure on the jack body to press the ram/claw to its bottom position.

Repeat this procedure as often as necessary to remove all air from the system. Again stand the jack on its base, remove the filler plug and check the oil is level with the bottom of the filler plughole. If not, top up to this level, replace filler plug and seal.

Supporting the Jack
Before use always ensure the jack is fully supported on a flat, firm surface with due regard to the load to be lifted.
Position the jack so that the load bears centrally on the top of the ram or on the full extent of the claw, ensuring that the load cannot touch any static part of the jack during lifting.

Lifting
The release valve (2) is located inside the operating socket (3) and can be opened or closed by engaging the end of the operating lever. Turning clockwise closes the valve; excessive force is unnecessary and could lead to damage. With the release valve closed and the operating lever in the socket, reciprocate the lever to operate the jack.
The ram will extend on each downward stroke of the lever. When the full extension has been achieved a positive stop is engaged; further pumping will only circulate oil within the jack. This circulation will be apparent to the operator because increased effort is necessary to move the operating lever.
Do not continue pumping after this has been reached.

Lowering
Place the operating lever in the operating socket and ensure that the end of the lever is engaged in the release valve. Carefully turn anti-clockwise. If the jack is under load, turn only a small amount, (approx. 5°); in the first instance which will allow the speed of descent to be controlled by the further extent of the valve opening.

Maintenance
In the normal course of service, no routine maintenance should be required, but attention to the following will assist in obtaining satisfactory service.
The oil level should be periodically checked; the reservoir should not be overfilled. Always use clean oil of the type specified.
Always wipe the claw/ram extension clean before retracting. Lightly grease the claw tenons occasionally.
Inspect and clean ram and jack after every use, if subjected to abnormal or shock loading inspect for damage immediately.
Refer to authorised service centre for testing and service.

Safety information
Always ensure that the full base area of the jack is supported when in use.
Always ensure that loads are applied centrally to the ram or to the full extent of the claw.
Always clean the ram and retract after use.
Always remove the jack operating handle when not in use.
In operation never drop loads onto the jack. Always raise the head/toe to the load.
Never extend the ram by any means other than by pumping the jack.
Do Not attempt to exceed the rated load of 5 tonnes on head or toe.
Do Not allow any person(s) to work under the load when it is only supported by hydraulic jacks.
Do Not use if there is evidence of oil leakage.

Tirfors: Safe Use Instructions (Tractel)

The tirfor® machine is a hand-operated lifting and pulling machine. It is versatile, portable and multi-purpose, not only for pulling and lifting but also for lowering, tensioning and guying. The Tirfor machine offers great mechanical advantage and is an easy and safe machine to use.

Before using a tirfor® machine, you must familiarise yourself with the operating and maintenance instructions supplied in the box. Additional copies can be requested from Certex (UK).

Below is a summary of the important steps to safely use a Tirfor machine;

1. Always make sure that any lifting equipment has been inspected by a competent person in line with the requirements of The Lifting Operations and Lifting Equipment Regulations (LOLER) before use.

2.Check that there is no visible sign of damage on the machine and thoroughly inspect the wire rope to ensure there are no broken strands, kinks, twists, opening of the rope (bird caging) or chemical contamination. The wire rope should be lubricated before use to ensure a smooth, non-jerky, operation. Take care when unwinding the rope from the reeler for the first time as it can spring out quickly. Check that the safety hook is undamaged and that the spring loaded safety catch is present and operational.

3. Check that the rope is a genuine Tractel Maxiflex rope identified by the one red strand and the Tractel pulling man logo stamped on the ferrule. Tractel ropes have been specifically designed to work with the tirfor® machine. Tractel cannot ensure the correct functioning of the tirfor® machine when a non Tractel rope is used. Ensure the rope is the correct diameter as detailed on the ID label on the machine. Using the incorrect diameter can cause damaged and may cause a load to slip. Also, make sure the rope is of sufficient length for the intended operation.

4.Check that the operating handle is present with the machine. These are specifically designed for each tirfor® machine to offer the correct leverage. Do not use any other handle or equipment to operate the levers as this may cause the machine to be overloaded.

5. Check the hook or anchor pin on the tirfor® machine is present and undamaged and that the spring loaded safety catch is present and operation on machines with a hook.

6. When rigging, ensure that all accessories such as slings, ground anchors or shackles are of equal or greater strength to the working load limit (WLL) of the machine.

7. To use the machine, you must first open the jaws so that the rope can be inserted. Press the safety catch and push the rope release lever until it locks open. Insert the tapered end of the wire rope into the rope entry guide and push through the machine. You may have to move the forward operating handle to ensure the jaws are open. Once the rope is installed, you must return the rope release lever to the original position so the jaws are fully engaged. To remove the rope after use, simply reverse this operation. Never attempt to open a rope release lever when the machine in under load.

8. Check that the tirfor® is suitably attached to an anchor of equal or greater strength than that of the WLL of the machine. Failure to anchor the tirfor® machine correctly runs the risk of a serious accident. The user must always ensure before operation that the anchor point(s) for the machine and wire-rope are of sufficient strength to hold the load.

9. To operate the tirfor® place the operating handle over the forward or reverse operating handle, lock into place by twisting and move backward and forwards to operate the machine. While operating the tirfor® machine, ensure the rope isn't travelling over any edges that may cause damage. If a pulley is to be used, ensure its diameter is at least 20x the diameter of the wire rope.

10. All tirfor® machines incorporate a shear pin system. In case of overload, one or more pins (depending on the model), fitted to the forward operating lever, shear and prevent further forward or lifting operations. Reverse operation is still possible to enable the load to be lowered or the wire rope to be slackened. All tirfor® machines are supplied with spare shear pins located under the plastic cap in the forward operating handle. Spares are available. Always ensure genuine Tractel shear pins are used as they are designed to shear at the correct load.

11. Never use a materials handling tirfor® for lifting people.

12. Always ensure a tirfor® machine is serviced to ensure a long life.

Blocfor: Safe Use (Tractel)

The Blocfor range is the only comprehensive fall arrest block range certified to 150kg to European standards and can be used vertically or horizontally in accordance with test of files CMB/P/11.062 testing with loads over 100kg and CMB/P/11.060 Horizontal use; Retractable Type Fall Arresters, Edge [Type A] Test.

Below is an overview of the key steps that must be followed to ensure a Blocfor is safe to use. For Full instructions for the safe use of the Blocfor range contact Certex (UK).

1. Always ensure the Blocfor has been properly inspected by a competent person and the certificate of inspection is in date before use.

2. Check all labels are present and legible.

3. Check the housing for signs of damage. This may include, impacts, cracks or chemical contamination.

4. Check the connector at the top of the Blocfor is present and that the gate opens and closes correctly and that it is also free from damage.

5. Check the connector at the bottom of the Blocfor using the same process.

6. Carefully pull out the webbing or wire rope (depending on the model) and check for damage along the entire length. For wire rope models - check for kinks, broken wires, bird caging or chemical contamination. For webbing models - check for cuts, burns, abrasion or chemical contamination.

7. Allow the rope to slowly retract back on to the drum while giving 3-4 sharp pulls over the length to ensure the rope or webbing tightens around the drum.

8. Check the shock pack is undamaged and that the clear plastic wrap is unbroken. If fitted with an additional fall indicator, check this isn't deployed.

9. Give the wire rope/webbing a sharp pull to ensure the pawl is engaging correctly.

10. A Blocfor must only be used with a full body harness rated to EN:361. Always attach a Blocfor to the front or rear attachment point at chest level.

Lifting KnowHow

Lifting KnowHow is our promise to our customers. It defines what we are and how we act in order to create ideal lifting solutions, avoid accidents and maintain high customer satisfaction.

> **Our Lifting KnowHow gives you the best possible service and technical support.**

Expertise
Is fundamental in our work to provide customized lifting solutions with high customer value.

Quality
Is always in focus and adapted for the lifting application, fulfilling customer needs and local market regulations.

Safety
Is essential for a good working environment and always first priority in all aspects of the lifting solutions we provide.

Service
Is vital in our work to provide customer value, assuming the role as a partner to our customers.

General sales and delivery terms

1. General
Tenders are submitted and orders accepted only upon and subject to the following Conditions of Sale

2. Acceptance
Unless previously withdrawn, our tender is open for acceptance within thirty days of the date hereof.
The acceptance of our tender must be accompanied by sufficient information to enable us to proceed with the order or we shall be at liberty to amend the tender price to reflect any increase in costs resulting from the late supply of necessary information.

3. Packing and Method of Delivery

Unless otherwise specified in our tender,
3.1 Goods to be delivered in the UK
3.1.1 Wooden packing cases, skids, drums, etc. must be returned to our Works at your expense and in good condition within one month from date of receipt, otherwise they will be charged for.
3.2 Goods to be supplied ex UK
3.2.1 Packing in accordance with our standard export practice is included within our tender and it is not returnable.
3.2.2 Delivery F.O.B. United Kingdom port stated in our tender is included. Where delivery C.I.F. is expressly stipulated, all charges for freight, insurance, etc., are based on the rates current at the time of quoting, and any variation in such rates is for your account.
3.3 All delivery terms are to be interpreted in accordance with ICC "INCOTERMS" current at the date of tender.

4. Limits of Contract
Our tender includes only for the supply of goods specified in our tender.

5. Drawings
All descriptive, specifications, drawings, and particulars of weights and dimensions submitted with our tender or otherwise are approximate only and are intended merely to present a general idea of the goods described therein. None of these shall form part of the contract.

6. Tests
Our goods are carefully inspected and, where practicable, submitted to our standard tests at our Works before despatch. If special tests are required or the tests are to be carried out in the presence of you or your representative, unless otherwise agreed in writing, these must be made at our Works and will be charged for.
In the event of any delay on your part in attending such tests after seven days' notice that we are ready, the tests will proceed in your absence and shall be deemed to have been made in your presence.

7. Performance
Any performance figures given by us are based upon our experience and are such as we expect to obtain on test but we accept no liability for failure to obtain any figures given by us for performance unless we specifically guarantee figures in writing with an agreed sum as liquidated damages agreed as damages for failure to attain performance criteria. In the event of any part of the goods failing to fulfil any performance guarantee, we shall be entitled to a reasonable period to comply with the same.
You assume responsibility for the specified capacity and performance of the goods being sufficient and suitable for your purpose.

8. Time for delivery
Any times quoted for despatch are calculated from receipt by us of the acceptance of our Tender and of all necessary information and drawings to enable us to proceed. Whilst every effort will be made to deliver the goods within any period specified in our Tender, we will not be liable for any delay in delivery

9. Terms of payment
9.1 All prices are quoted and payable in sterling.
9.2 Unless otherwise agreed in writing, all invoices must be paid not later than 30 days from the date of Invoice. All payments shall be made without deduction or set off. When deliveries (or the provision of services) are spread over a period each consignment will be invoiced as dispatched and each month's invoices will be treated as a separate account and be payable accordingly. Failure to pay for any Goods or for any delivery or instalment shall entitle the Seller to suspend further deliveries and work both on the same order and on any other order form the Buyer without prejudice to any other right the Seller may have. The Seller reserves the right where genuine doubts arise as to a Buyer's financial position or in the case of failure to pay for any Goods or any delivery or instalment as aforesaid to

suspend work on and delivery of any order
or any part or instalment without liability until payment or satisfactory security for payment has been
provided.
9.3. In the case of sales FOB United Kingdom port, unless otherwise agreed, the Buyer shall upon
request by the Seller nominate a vessel willing to receive the Goods. Failing such a nomination within thirty
(30) days (or such longer period as may be agreed by the Seller) the Seller shall be entitled to require
immediate payment for the Goods and to place the Goods in store at the risk and expense of the Buyer or to
treat the contract as discharged and dispose of the Goods.
9.4. If the contract stipulates that payment is made by letter of credit this must be by irrevocable letter of
credit drawn on or confirmed by a first class United Kingdom bank to be paid over United Kingdom counter
and all the appropriate documentation is presented to the Seller when requested by the Seller or otherwise in
accordance with the contract.
9.5 Any overdue payments shall be subject to interest at 8% above the rate from time to time charged by
Barclays Bank Plc for each month or part thereof that payment remains overdue.
9.6 If for any reason you cannot take delivery or if from any cause beyond our control we are unable to
despatch the goods, payment of the contract value of the goods shall be due upon presentation of invoices
and notification from us that the goods are ready for despatch after having been tested as may be required
by Condition 6.
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10. Price Adjustment

The price appearing in our tender ("the Contract Price") shall be subject to adjustment as follows:
(a) In the event of the suspension of work by your instructions or lack of instructions, the Contract
Price shall be increased to cover any extra expense thereby incurred by us.
(b) We reserve the right to increase all prices by the amount to which we become liable in respect of any
tariffs, duties or taxes whatsoever imposed.

11. Storage

If we do not receive forwarding instructions sufficient to enable us to despatch within seven days, or in the
case of goods for export, fourteen days after notification that the goods have been tested under Condition 6
or that they are ready for despatch, you shall take delivery or arrange for storage. If delivery is not taken or if
you do not promptly arrange for storage, we shall be entitled to store the goods at your risk and expense

12. Damage in transit

We accept no responsibility for loss or damage to the goods or the packing thereof, beyond the point to
which we contract to deliver the same. Up to that point we shall not be liable for damage or loss or nondelivery
of the goods or any part thereof unless in the case of damage, you expressly notify us and our
carriers (if known to you) in writing of the existence of damage within three days and notify us in writing of
detailed particulars of the same within seven days after the termination of the transit, and in the case of loss
or non-delivery you expressly notify us and our carriers (if known to you) in writing of the loss or non-delivery
within fourteen days and supply particulars thereof within twenty-eight days after the date on which the
transit of the goods was terminated or would, in the normal course of events, have terminated and subject
thereto we will repair or replace free of charge to you the goods damaged, lost or undelivered as the case
may be.
When Bills of Lading are taken out by us, we will, on your instructions and at your expense, insure against
loss or other risk, and will, on receipt of your indemnity, take all reasonable steps to recover from the
underwriters any loss or damage for which they may be liable.

13. Transfer of Ownership

13.1 The risk in the Goods shall pass to the Buyer:
(a) Unless our tender stipulates otherwise when the Goods are dispatched from the Sellers works and
the Seller accepts no responsibility for any damage or loss in transit.

(b) If the Goods are appropriated to the Buyer but kept at the Seller's premises upon collection of the
goods by the Buyer or upon the expiry of 7 days from the Seller's written notice to the Buyer that such Goods
are ready for delivery whichever is the earlier.

13.2 Notwithstanding sub-clause (13.1) above absolute property in and title to the Goods shall remain
vested in the Seller and the Buyer shall keep the Goods as bailee and trustee for the Seller (returning the
same to the Seller upon request) until the price thereof has been paid in full together with any interest and all
other sums due in respect thereof from the Buyer in accordance with the order and until payment in full has
been received by the Seller for any other Goods supplied by the Seller and of any other monies due from the
Buyer to the Seller on any account.
13.3 Pending payment for Goods as aforesaid the Buyer shall not mix or incorporate the Goods with any
other Goods and shall keep the Goods suitably marked or otherwise plainly identified that they are the
property of the Seller.
13.4 Pending payment for Goods as aforesaid the Buyer shall store them separately and in such a way
that they can be identified as the property of the Seller, and the Seller shall be entitled to direct the Buyer not

General sales and delivery Cont'd.

to resell the same or remove them from where they are located without consent. Any Goods in the Buyer's possession shall be presumed not to have been paid for unless the Buyer can prove otherwise and the Seller shall have the right to appropriate any payment made by the Buyer to any invoice or invoices (whether or not due at the time of payment) in the Seller's absolute discretion. If pending payment for Goods as aforesaid the Buyer shall sell or otherwise dispose of the Goods or make any insurance claim in respect thereof, the Buyer shall not give any warranties or incur any liabilities on behalf of the Seller and the proceeds of any such sale or other disposition (or claim hereto) or any such insurance proceeds (or claim thereto) shall belong to the Seller and be held by the Buyer as trust funds to the extent of all sums due to the Seller in respect of such Goods, and the Buyer shall pay such proceeds into a separate account.

13.5 At any time prior to full payment (whether or not payment is then overdue) the Seller may (without prejudice to any of its other rights) retake possession of the Goods or any part thereof and may enter on the Buyer's premises by its employees or agents for that purpose of for the purpose of ascertaining whether the Buyer is complying with the provisions of this clause.

13.6 Any Goods repossessed by the Seller may be resold on such terms as the Seller may determine and the Buyer shall remain liable to the Seller for the difference between the net proceeds of such resale and all outstanding sums due to the Seller in respect of such Goods and for all costs and expenses incurred by the Seller in repossessing, storing and reselling the same.

13.7 Nothing in this clause shall give the Buyer any right to return Goods sold by the Seller and the Seller may sue the Buyer for the price when due (without prejudice to its other rights) notwithstanding that property therein may not have passed to the Buyer.

13.8 The Buyer's rights to use the Goods or to sell them prior to full payment may be terminated forthwith by written notice given by the Seller to the Buyer and shall automatically terminate with or without such notice if a receiver is appointed over any of the assets or the undertaking of the Buyer or a winding up order is made against the Buyer or the Buyer goes into voluntary liquidation (otherwise than for the purpose of solvent reconstruction or amalgamation) or calls a meeting of or makes any arrangement or composition with its creditors generally or commits any acts of bankruptcy or allows execution or distress to be levied against its goods and in the event of a Receiver or Liquidator of the Buyer being appointed, such Receiver or Liquidator shall pay into a separate bank account any sums received from third parties in respect of sales to them of Goods or Products by the Buyer up to the amount of any indebtedness of the Buyer to the Seller for the sole benefit of the Seller

1. Defects Guarantee

14.1 All goods of our manufacture are guaranteed against defects from faulty design, materials, or workmanship for twelve months from the date of despatch. We will make good by repair or replacement of the defective part any such defect, provided that such defective parts are promptly returned to our Works or Store, all charges prepaid. The repaired or new parts will be delivered free in the United Kingdom. Defective parts thus replaced remain our property.

14.2 Our liability hereunder is in lieu of any condition or warranty implied by law or otherwise as to the suitability of the goods for any particular purpose, use or application.

15. Limitations of Liability

15.1 We shall not be liable, whether in contract or by way of indemnity or tort (including but not limited to negligence) or for loss of contracts, loss of profits or use or any other economic loss resulting from any default.

15.2 In respect of all other losses, our liability shall be limited to the £1,000,000 or the contract price, whichever is greater.

16. Patents

We will indemnify you against any claim of infringement of Letters Patent or Registered Design (valid at date of the contract) by the use or sale of any article or material supplied by us to you and against all costs and

CERTEX (UK) - Unit C1 Harworth Industrial Estate, Bryans Close, Harworth, Doncaster. DN11 8RY
Sales Tel: 0845 230 7475 | Sales Fax: 0845 230 7476 | Accounts Tel: 01302 756777 | Accounts Fax: 01302 745338

damages which you may incur in any action for such infringement or for which you may become liable in any such action. Provided always that this indemnity shall not apply to any infringement, which is due to our having followed a design or instruction furnished or given by you, or to the use of such article or material in a manner or for a purpose or in a foreign country not specified

by or disclosed to us. And provided also that this indemnity is conditional on your giving to us the earliest possible notice in writing of any claim being made or action threatened or brought against you and on your permitting us at our own expense to conduct any litigation that may ensure and all negotiations for a settlement of the claim. Provided also that this indemnity is conditional on your not making any admission, which might be prejudicial to such negotiations or litigation, and affording us all available assistance for such purposes, any expenses incurred by you in so doing being repaid by us. You on your part warrant that any design or instruction furnished or given by you shall not be such as will cause us to infringe any Letters Patent, Registered Design or Trade Mark in the execution of your order.

17. Arbritration

If at any time any dispute or difference arises between out of or in connection with the contract, either of us may give the other notice in writing of the existence of such dispute, or difference, and the same shall be referred to the arbitration of a person to be mutually agreed upon, or failing agreement, within fourteen days of the receipt of such notice, of some person appointed by the President for the time being of the Chartered Institution of Arbitration. The submission shall be deemed to be a submission to arbitration within the meaning of the Arbitration Acts 1950-1996 or any statutory modification or re-enactment thereof.

18. Determination of a contract

If you shall make any arrangement or composition with creditors, or commit any act of bankruptcy, or if any petition or receiving order in bankruptcy shall be presented or made against you, or if, being a limited company, any resolution or petition to wind up the company's business (other than for the purpose of amalgamation or reconstruction) shall be passed or presented, or if a receiver or manager shall be appointed of your company's undertaking, property or assets, we shall have the right forthwith to determine the contract, and upon written notice of such determination being posted to your last known address, the contract shall be deemed to have been determined.

19. Applicable Law

The contract shall in all respects be construed and operate in conformity with English Law and is subject to the exclusive jurisdiction of the English Courts.

20. Clause applicable to contracts where free issue materials supplied by customer

The supplier of any free issue items to Certex (UK) warrants that such items shall be suitable for the purpose for which they are supplied and will indemnify Certex (UK) against any damages or liabilities incurred by Certex (UK) to any third party as a result such warranty.

9.6 If for any reason you cannot take delivery or if from any cause beyond our control we are unable to despatch the goods, payment of the contract value of the goods shall be due upon presentation of invoices and notification from us that the goods are ready for despatch after having been tested as may be required by Condition 6.

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10. Price Adjustment

The price appearing in our tender ("the Contract Price") shall be subject to adjustment as follows:

(a) In the event of the suspension of work by your instructions or lack of instructions, the Contract Price shall be increased to cover any extra expense thereby incurred by us.

(b) We reserve the right to increase all prices by the amount to which we become liable in respect of any tariffs, duties or taxes whatsoever imposed.

11. Storage

If we do not receive forwarding instructions sufficient to enable us to despatch within seven days, or in the case of goods for export, fourteen days after notification that the goods have been tested under Condition 6 or that they are ready for despatch, you shall take delivery or arrange for storage. If delivery is not taken or if you do not promptly arrange for storage, we shall be entitled to store the goods at your risk and expense

12. Damage in transit

We accept no responsibility for loss or damage to the goods or the packing thereof, beyond the point to which we contract to deliver the same. Up to that point we shall not be liable for damage or loss or nondelivery of the goods or any part thereof unless in the case of damage, you expressly notify us and our carriers (if known to you) in writing of the existence of damage within three days and notify us in writing of detailed particulars of the same within seven days after the termination of the transit, and in the case of loss or non-delivery you expressly notify us and our carriers (if known to you) in writing of the loss or non-delivery within fourteen days and supply particulars thereof within twenty-eight days after the date on which the transit of the goods was terminated or would, in the normal course of events, have terminated and subject thereto we will repair or replace free of charge to you the goods damaged, lost or undelivered as the case may be.

When Bills of Lading are taken out by us, we will, on your instructions and at your expense, insure against loss or other risk, and will, on receipt of your indemnity, take all reasonable steps to recover from the underwriters any loss or damage for which they may be liable.

13. Transfer of Ownership

13.1 The risk in the Goods shall pass to the Buyer:

Product index

Load table

Chainsling grade 80

Safety Factor 4:1 BS EN 818—4

	Single		2-leg				3- & 4-leg		Endless	Loop chain	
Beam angle	–	–	0°– 45°	45°– 60°	0°– 45°	45°– 60°	0°– 45°	45°– 60°	–	0°– 45°	45°– 60°
Load Factor	**1**	**0,8**	**1,4**	**1**	**1,2**	**0,8**	**2,1**	**1,5**	**1,6**	**1,4**	**2,1**
d	**WLL ton**										
6	1,12	0,9	1,6	1,12	1,25	0,9	2,36	1,7	1,8	1,6	2,36
7	1,5	1,2	2,12	1,5	1,7	1,2	3,15	2,24	2,5	2,12	3,15
8	2	1,6	2,8	2	2,24	1,6	4,25	3	3,15	2,8	4,25
10	3,15	2,5	4,25	3,15	3,55	2,5	6,7	4,75	5	4,25	6,7
13	5,3	4,25	7,5	5,3	5,9	4,25	11,2	8	8,5	7,5	11,2
16	8	6,3	11,2	8	9	6,3	17	11,8	12,5	11,2	17
19	11,2	8,95	16	11,2	12,5	8,95	23,6	17	18	16	23,6
22	15	12	21,2	15	17	12	31,5	22,4	23,6	21,2	31,5
26	21,2	16,95	30	21,2	23,7	16,95	45	31,5	33,5	30	45
32	31,5	25,2	45	31,5	35,2	25,2	67	47,5	50	45	67

Chainsling grade 100

Safety Factor 4:1 BS EN 818—4*
*higher WLL

	Single		2-leg				3- & 4-leg		Endless	Loop chain	
Beam angle	–	–	0°– 45°	45°– 60°	0°– 45°	45°– 60°	0°– 45°	45°– 60°	–	0°– 45°	45°– 60°
Load Factor	**1**	**0,8**	**1,4**	**1**	**1,2**	**0,8**	**2,1**	**1,5**	**1,6**	**1,4**	**2,1**
d	**WLL ton**										
5	1	0,8	1,4	1	1,12	0,8	2	1,5	1,6	1,4	2
6	1,4	1,12	2	1,4	1,6	1,12	3	2,12	2,24	2	3
7	1,9	1,5	2,65	1,9	2,12	1,5	4	2,8	3	2,65	4
8	2,5	2	3,55	2,5	2,8	2	5,3	3,75	4	3,55	5,3
10	4	3,15	5,6	4	4,25	3,15	8	6	6,3	5,6	8
13	6,7	5,3	9,5	6,7	7,5	5,3	14	10	10,6	9,5	14
16	10	8,1	14	10	11,2	8	21,2	15	16	14	21,2
19	14	11,2	20	14	16	11,2	30	21,2	22,4	20	30
22	19	15	26,5	19	21,2	15	40	28	30	26,5	40
26	26,5	21,2	37,5	26,5	30	21,2	56	40	42,5	37,5	56
32	40	31,5	56	40	45	31,5	85	60	63	56	85

Chainsling grade 120

Safety Factor 4:1 BS EN 818—4*
*higher WLL

	Single		2-leg				3- & 4-leg		Endless	Loop chain	
Beam angle	–	–	0°– 45°	45°– 60°	0°– 45°	45°– 60°	0°– 45°	45°– 60°	–	0°– 45°	45°– 60°
Load Factor	**1**	**0,8**	**1,4**	**1**	**1,2**	**0,8**	**2,1**	**1,5**	**1,6**	**1,4**	**2,1**
d	**WLL ton**										
7	3,2	0,65	1,6	1,15	0,8	1,7	1,2	1,6	1,3	3,2	3,2
7	4,2	0,8	2,1	1,45	1,05	2,2	1,8	2,1	1,7	4,2	4,2
8	5,2	1,0	2,6	1,8	1,3	2,7	1,9	2,	2,0	5,2	5,2
9	6,0	1,2	3,0	2,2	1,5	3,3	2,3	3,0	2,5	6,0	6,0

Textile Slings

Working load limits are in accordance with:
Webslings BS EN 1492-1: 2000
Roundslings BS EN 1492-2:2000
Rated Capacities for Webslings & Round Slings
Powertex Duplex & Single Webslings
Powertex Roundslings & Endless Webslings

Colour	Webbing width	Working load limit (WLL) in tons				
						
	mm	Straight pull	Choke hitch	Basket hitch		
				0°	0°-45°	45°-60°
Violet	50	1	0,8	2	1,4	1
Green	60	2	1,6	4	2,8	2
Yellow	90	3	2,4	6	4,2	3
Grey	120	4	3,2	8	5,6	4
Red	150	5	4,0	10	7,0	5
Brown	180	6	4,8	12	8,4	6
Blue	240	8	6,4	16	11,2	8
Orange	300	10	8,0	20	14,0	10