



# Instructions for the safe use of: Eyebolts

The information in this leaflet should be passed to the user of the equipment

This document is issued in accordance with the requirements of Section 6 of the Health and Safety at Work etc Act 1974, amended March 1988. It outlines the care and safe use of EYEBOLTS and is based on Section 19 of the LEEA Code of Practice for the Safe Use of Lifting Equipment.\* It should be read in conjunction with the requirements for general purpose slinging practice given overleaf, the principles of which may be applied to the use of eyebolts with or without slings.

This information is of a general nature only covering the main points for the safe use of eyebolts which comply with BS 4278 or the withdrawn standard BS 529 Part 1. It may be necessary to supplement this information for specific applications.

## ALWAYS:

- Store and handle eyebolts correctly.
- Inspect eyebolts before use and before placing into storage.
- Select the correct pattern eyebolt for the application.
- Ensure that the eyebolt and tapped hole threads are compatible and strong enough for the load.
- Correctly align the plane of the eye using shims where necessary.
- Ensure that the collar is fully seated when hand tight.

## NEVER:

- Use tommy bars, grips or wrenches to tighten eyebolts.
- Use dynamo eyebolts for angular loading.
- Use a single eyebolt to lift a load that is free to rotate.
- Reeve slings through the eyes, links or shackles fitted to pairs of eyebolts.
- Force hooks or other fittings into the eye; they must fit freely.
- Shock load eyebolts.

## Selecting the Correct Eyebolt

Eyebolts to BS 4278 are available in three standard types, eyebolt with link, collar eyebolt and dynamo eyebolt. Select the eyebolt to be used and plan the lift taking the following into account:

Type of eyebolt - eyebolt with link for all general purpose applications, collar eyebolt for most general duties, dynamo eyebolt only where a truly axial load is guaranteed. (A collar eyebolt fitted with a link through the eye must always be considered as a collar eyebolt and not as an eyebolt with link.)

Capacity - (rating eyebolts for angular loading) It is necessary to reduce the SWL by the following factors when using eyebolts with two leg slings:

Type of eyebolt	Included angle $\alpha$ of sling legs		
	$0 < \alpha \leq 30$	$30 < \alpha \leq 60$	$60 < \alpha \leq 90$
Eyebolt with link	1.0	0.8	0.63
Collar eyebolt	0.63	0.4	0.25

## Storing and Handling Eyebolts

Never return damaged eyebolts to storage. They should be dry, clean and protected from corrosion. Care must be taken to protect threads from damage whilst in store.

Where possible use removable plugs to exclude debris from tapped holes.

## Using Eyebolts Safely

Do not attempt lifting operations unless you understand the use and limitations to use of the equipment, the slinging procedures and the mode factors to be applied.

Do not use defective eyebolts. Check the thread of both the eyebolt and hole, ensure they are compatible, fully formed, of sufficient length, undamaged and clear of any debris which may prevent proper engagement.

Ensure the contact surface around the hole is flat, clean and perpendicular to the thread axis. Tighten the eyebolt down firmly by hand. The eye must be in the correct plane and the collar must sit evenly on the contact surface. Use shims but do not machine the collar or over tighten to achieve this.

A hook may be engaged directly into the eye of a dynamo eyebolt or the link of an eyebolt with link. Collar eyebolts must be fitted with a shackle or link to accept hooks. The hooks must fit freely so do not wedge or force them into position.

Never reeve a sling through the eyes, links or shackles fitted to eyebolts used in pairs as this will impose a severe resultant load to the eyebolts.

Dynamo eyebolts must only be used for axial loading. When using eyebolts with multi-leg slings use eyebolts with links or collar eyebolts taking care to de-rate them correctly for angular loading conditions.

Where a single eyebolt is used, use a swivel or swivel hook to prevent the eyebolt unscrewing.

## In-service Inspection and Maintenance

Maintenance requirements are minimal. Keep eyebolts clean, protect from corrosion and protect threads from damage. Do not attempt to straighten bent eyebolts or re-cut threads.

Regularly inspect eyebolts and, in the event of the following defects, refer the eyebolt to a Competent Person for thorough examination: illegible markings; distortion; worn, or bent shanks and threads; incomplete or incorrectly formed threads; damaged eyes; nicks, gouges, cracks, corrosion or other defects.

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Further information is given in:

*HSE Guidance Note PM 16 – Eyebolts*

\* *The Code of Practice for the Safe Use of Lifting Equipment, published by:*

**LIFTING EQUIPMENT ENGINEERS ASSOCIATION**

## GENERAL PURPOSE SLINGING PRACTICE

The following information is based on Section 1 - Appendix 1.5 of the LEEA Code of Practice for the Safe Use of Lifting Equipment.\* It should be read in conjunction with the instructions for the safe use, given overleaf, of which it forms an integral part and with any specific instructions issued by the supplier.

This information is of a general nature only covering the main points for the safe use of various types of slings for general lifting purposes.

### ALWAYS:

- Plan the lift, establish the weight of the load and prepare the landing area ensuring that it will take the weight.
- Check slings and equipment are free of damage, use slings/slinging methods suitable for the load and protect slings from sharp edges and corners.
- Attach the sling securely to the load and appliance and position hooks to face outwards.
- Ensure the load is balanced and will not tilt or fall.
- Keep fingers, toes etc clear when tensioning slings and when landing loads.
- Ensure that the load is free to be lifted.
- Make a trial lift and trial lower.

### NEVER:

- Use damaged slings or accessories.
- Twist, knot or tie slings.
- Hammer slings into position.
- Overload slings due to the weight of the load or the mode of use.
- Trap slings when landing the load.
- Drag slings over floors etc or attempt to pull trapped slings from under loads.
- Allow personnel to ride on loads.

## Sling Configurations and Rating

Slings are available in single, two, three and four leg or endless form. In practice it will be found that chain, wire rope and fibre rope slings are available in any of these configurations but that flat woven webbing is limited to single leg and endless whilst roundslings are only supplied in endless form. The maximum load that a sling may lift in use will be governed by the slinging arrangement (mode of use) and may vary from the marked SWL.\*\* In the case of textile slings the SWL for the various modes of use is usually given on the information label. In other cases it is necessary to multiply the marked SWL by a mode factor.\*\*\*

The following three simple rules will ensure that the sling is not overloaded. In some cases this will mean that the sling will be under utilised although this is unlikely to hinder the user unduly. Where the maximum utilisation is required reference should be made to a Competent Person who understands the factors involved and who can perform the necessary calculations.

- (1) For straight lift never exceed the marked SWL and in the case of multi-leg slings the specified angle or range of angles.
- (2) When using slings in choke hitch multiply the marked SWL by 0.8 to obtain the reduced maximum load the sling may lift ie reduce the safe working load by 20%.
- (3) With multi-leg slings, when using less than the full number of legs, reduce the maximum load in proportion to the number of legs in use. Simply multiply the marked SWL by the number of legs in use expressed as a fraction of the total thus: one leg of a two leg sling =  $\frac{1}{2}$  marked SWL, three legs of a four leg sling =  $\frac{3}{4}$  marked SWL and so on.

## Operative Training

Slings should only be used by trained operatives who understand the methods of rating and application of mode factors.\*\*\*\*

## Safe use of Slings

- o Good slinging practice must ensure that the load is as safe and secure in the air as it was on the ground and that no harm is done to the load, lifting equipment, other property or persons.
- o Establish the weight of the load, ensure the lifting method is suitable and inspect the sling and attachments for obvious defects. Prepare the landing area making sure the floor is strong enough to take the load. Follow any specific instructions from the supplier.
- o Ensure the lifting point is over the centre of gravity. Any loose parts of the load should be removed or secured. Secure the sling firmly to the load by hooks onto lifting points or shackles etc. The sling must not be twisted, knotted or kinked in any way.
- o Use packing to prevent damage to the sling from corners or edges and to protect the load.
- o Do not exceed the SWL or rated angle. Any choke angle must not exceed 120° and any basket 90°.
- o Do not hammer, force or wedge slings or accessories into position; they must fit freely.
- o When attaching more than one sling to the hook of the appliance use a shackle to join the slings and avoid overcrowding the hook.
- o Use an established code of signals to instruct the crane driver.
- o Ensure the load is free to be lifted and not, for example, bolted down.
- o Check that there are no overhead obstacles such as power lines.
- o Keep fingers, toes etc clear ensuring they do not become trapped when lifting, lowering or controlling loads.
- o Make a trial lift by raising the load a little to ensure it is balanced, stable and secure and if not lower it and adjust the slinging arrangement.
- o Where appropriate use tag lines to control the load.
- o Except where special provision is made, do not allow anyone to pass under or ride upon the load. The area should be kept clear.
- o Make a trial set down, ensure the sling will not become trapped and the load will not tip when the slings are released. Use supports which are strong enough to sustain the load without crushing.
- o Never drag slings over floors etc or attempt to drag a trapped sling from under a load.
- o Never use a sling to drag a load.
- o Place the hooks of free legs back onto the master link and take care to ensure that empty hooks do not become accidentally engaged.
- o Never use slings in contact with chemicals or heat without the manufacturers approval.
- o Never use damaged or contaminated slings.
- o On completion of the lift return all equipment to proper storage.

Further information is given in:

\* LEEA Code of Practice for the Safe Use of Lifting Equipment.

\*\* BS 6166 Part 1 - Lifting Slings, Methods of Rating.

\*\*\* BS 6166 Part 3 - Selection and Safe Use of Lifting Slings for Multi-purposes.

\*\*\*\* HSE Guidance Note GS39 - Training of Crane Drivers and Slingers.

Various British Standards covering individual products.