



Grade 8 Chain Slings for General Lifting Purposes to BS EN 818-4: 1997
Guidance for the Manufacturer, Purchaser
and User of Mechanically Assembled Slings
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Grade 8 Chain Slings for General Lifting Purposes to BS EN 818-4: 1997 Guidance for the Manufacturer, Purchaser and User of Mechanically Assembled Slings

Introduction

This guidance has been prepared by the LEEA, in collaboration with leading manufacturers and suppliers of grade 8 chain sling systems, in order to clarify the procedures to be adopted by the sling manufacturer (assembler) of grade 8 mechanically assembled chain slings to BS EN 818-4: 1997 and explain some important changes for the purchaser and user of the sling.

It is drafted in three parts. This part is a brief explanation of the new legislation and the harmonised standards which support it and which brought about this new standard. It also includes a summary of responsibilities. The second is the guidance for the manufacturer and the third is the guidance for the purchaser and user. The second and third parts are also published separately as documents LEEA 026 and LEEA 027 respectively.

The new legislation

The implementation of EC Directives into UK law is resulting in the introduction of new legislation and the repeal and revocation of older legislation. The first changes were the introduction of the Supply of Machinery (Safety) Regulations 1992, and the Provision and Use of Work Equipment Regulations 1992.

The Supply of Machinery (Safety) Regulations 1992, and subsequent amending regulations, include requirements for the design, manufacture, marking and documentation to place lifting equipment on the market. A major change to the way new lifting equipment is treated, is the requirement for the manufacturer, or other responsible person, to issue an EC Declaration of Conformity. This permits the item to enter service and replaces the test certificate required by earlier legislation. The equipment must also be marked with the CE marking to indicate that it complies.

The Provision and Use of Work Equipment Regulations 1992 (PUWER) did not specifically cover lifting equipment, and so the existing specific legislation referring to its use, eg the Factories Act and all of the Regulations made under the Act, were initially left in place. An amendment to the European Work Equipment Directive bringing in specific requirements has resulted in a new 1998 edition of PUWER and the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER), which repeal or revoke all the older industry specific legislation referring to lifting equipment.

These changes complete a circle of safety based legal requirements. In summary, manufacturers, or other responsible persons, must ensure that the equipment they place on the market meets with the essential safety requirements of the European Machinery Directive. The EC Declaration of Conformity and CE marking confirm this. Employers must ensure that the equipment they obtain and provide to their employees for use at work complies with the relevant European Directives.

They will of course, also have to meet all the other

requirements of the Provision and Use of Work Equipment Regulations (PUWER) and the Lifting Operations and Lifting Equipment Regulations (LOLER) which refer to its use.

As the Directives, and therefore the implementing regulations, are blanket goal setting requirements imposed on all, they affect many areas previously excluded from specific legislation, eg there was no specific legislation referring to lifting equipment used in such places as hospitals, schools or farms, which will now be caught by the new legislation.

How the Sling Manufacturer Demonstrates Compliance with the Directive - The Technical File

The Machinery Directive requires the manufacturer to identify the potential hazards associated with his product, assess the risk and by good design and other means reduce the risk to an acceptable minimum. Also the product must be accompanied by adequate instructions for use and maintenance. As evidence of how he has done this he must be able to compile a Technical File for presentation to the enforcing authority (HSE in the UK) when requested. This is an onerous duty as the information required is very detailed. However one means, and the easiest, is to manufacture the product to a harmonised European standard.

Harmonised European Standards

Harmonised European standards are safety standards. They go through a lengthy checking procedure prior to acceptance to ensure that they comply with strict rules imposed by the European Commission and CEN, the European standards body. A harmonised standard has a quasi-legal status in that products which comply with a harmonised standard are deemed to meet the essential health and safety requirements of the Directive in so far as the standard addresses those requirements. Unlike the older standards they are replacing, harmonised standards are intended to enable the manufacturer to demonstrate compliance with the Directive.

BS EN 818-4: 1997 is a harmonised European standard for grade 8 chain slings using chain and components which comply to other, specified harmonised standards. For mechanically assembled chain slings assembled from components of a sling system, the 'sling manufacturer' is the assembler of the sling and not to the system manufacturer from whose chain and components the sling is assembled.

The sling system manufacturer's certificates for the chain and components are an important part of the Technical File. Full traceability for the chain and components used is therefore essential. This should not prove to be a problem for Association members as the LEEA Technical Requirements already call for a positive system to be in place that allows full traceability in both directions, ie from the suppliers records to the job and from the job to the suppliers records.

Copies of the sling system manufacturer's assembly instructions, technical information and the instructions for the safe use as issued to the user are also important ingredients of the Technical File.

Grade 8 Chain Slings for General Lifting Purposes to BS EN 818-4: 1997

Guidance for the Manufacturer of Mechanically Assembled Slings

(This guidance is also published separately as document LEEA 026)

BS EN 818-4 has the quasi-legal status of a harmonised European standard. (For an explanation of this see page 1 of document LEEA 025) As the sling manufacturer, it is important to realise that if you use and quote BS EN 818-4 as your means of complying with the Machinery Directive, it is essential that you work fully to its requirements with no deviations, no matter how minor you may consider them. Statements such as 'generally in accordance with BS EN 818-4' are not acceptable.

This will require changes to current practices for the assembly, marking and certification of chain slings assembled by mechanical joining devices. If you do not work fully to the standard, then you will have to identify the way in which you deviate and address the relevant essential health and safety requirements directly and provide your own evidence for the technical file. This guidance summarises the key changes introduced by BS EN 818-4 and provides a check list covering each stage of manufacture.

Summary of changes introduced by BS EN 818-4

In the EN 818 series of standards, the working load limits (WLLs) for the chain and hence the slings were calculated from first principles and only rounded down once at the end of the calculation to get the optimum WLLs. Previously some rounding down had occurred at several stages in the calculation. Thus, size for size, the WLLs in BS EN 818-4 may vary from earlier standards.

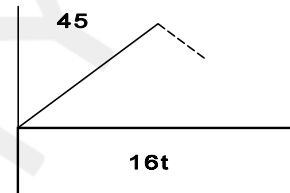
For chain slings intended for general lifting service, BS EN 818-4 permits only the uniform load method of rating.

General purpose slings rated by the trigonometrical method cannot be certified as being in compliance with the standard. In some cases this means that a larger size of chain will be required but not always because the uniform load method makes allowance for certain modes of use which would require a reduction under the trigonometrical method of rating.

The marking requirements for multi-leg slings to BS EN 818-4 differ from previous standards in that the angle of the sling legs is measured between the leg and the vertical instead of between opposite legs. Thus a typical marking to BS EN818-4 will be:

WLL 16t 0° - 45° instead of: WLL 16t 0° - 90°

Alternatively the range of angles may be shown by a pictograph on the identification tag similar to that shown below. We strongly recommend that such a pictograph is used.



The safety information you supply with grade 8 mechanically assembled slings should therefore be reviewed and amended or supplemented to explain these changes.

Check List

- | | |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1) Check the certificates for the chain and components. | You must have the relevant certificates to hand and you must ensure that they are correct before you assemble the sling. |
| (2) Select the chain size. | Select the size of chain for the WLL required from table 3 of BS EN 818-4. Multi-leg slings for general purposes must be rated by the uniform load method. |
| (3) Assemble the sling. | Follow any specific instructions issued by the system manufacturer. |
| (4) Thoroughly examine the sling. | Ensure all components are correctly assembled and the locking devices are in place. We recommend that you choose the option not to proof test the assembled sling as the manufacturer of the chain and components has already certified them to the relevant standards. |
| (5) Mark the sling with all of the necessary information. | Single leg slings should be marked with the following information:
(a) Working load limit in tonnes or kilograms, units t or kg to be included
(b) Individual identification mark related to the manufacturer's certificate
(c) Grade of sling, ie 8
(d) The sling manufacturer's name or symbol
(e) The CE mark (an additional mark required by the Directive)
(f) Optionally, the nominal size of chain may also be shown. |
- Multi-leg slings should be marked with the following information:
- (a) Working load limit and range of angles, 0° - 45°
(additionally 45° - 60° may be shown)
 - (b) Individual identification mark related to the manufacturer's certificate
 - (c) Grade of sling, ie 8

Continued overleaf

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- (d) The sling manufacturer's name or symbol
- (e) The number of legs
- (f) The CE mark (an additional mark required by the Directive)
- (g) Optionally, the nominal size of chain may also be shown.

We recommend that the marking is on a tag attached to the master link, or a link adjacent to the master link, and includes a pictograph showing the range of angles to the vertical and WLL. BS EN 818-4 allows the marking to be made directly onto the master link, provided that the mechanical properties of the link are not impaired. This is difficult to do, hence the use of the tag, but we recommend that the identification mark should be put on the master link so if the tag is damaged or lost, the remaining information can be retrieved from the certificate.

- (6) Prepare the Manufacturer's Certificate and EC Declaration of Conformity.

BS EN 818-4 requires each sling to have a manufacturer's certificate. In addition, to comply with the law, the sling manufacturer must issue an EC Declaration of Conformity. They can be separate but as much of the information is the same, we recommend that a single combined document be used. A model document is appended.

Guidance on the legislation warns against issuing copies of the EC Declaration of Conformity. To avoid subsequent difficulties we strongly recommend that the information for safe use, EC Declaration of Conformity, Manufacturer's Certificate and any other documentation issued with the sling should accompany the delivery and be listed on the delivery note so that a signature is obtained for it.

The manufacturer's certificate contains much, but not all, of the information previously shown on test certificates. If the sling is not tested after assembly, it is not necessary to give details of any individual proof forces for the chain or components and we recommend that this information is not given.

BS EN 818-4 requires the following minimum information to be shown on the manufacturer's certificate:

- (a) The name of the sling manufacturer or supplier including the date of issue of the certificate and authentication;
- (b) the number and Part of the standard, ie EN 818-4;
- (c) the identification number or symbol of the sling;
- (d) a description of the sling, to include a list of all component parts;
- (e) the nominal size of chain and grade mark 8;
- (f) the nominal length;
- (g) the working load limit (WLL) and;
- (h) in the case of a sling not proof-tested after assembly, the name of the competent person or establishment which carried out the visual examination.

The EC Declaration of Conformity must:

- (a) State the business name and full address of the sling manufacturer.
- (b) Contain a description of the sling including its make, type and serial number. (The 'make' in this case being the name of the sling system)
- (c) State that the equipment complies with the Machinery Directive and any other relevant Community Directives.
- (d) Specify the transposed harmonised standards used ie BS EN818-4.
- (e) Identify the person authorised to sign the declaration.
- (f) Be typed, or written by hand in block capitals and be in English.

- (7) Ensure full traceability of records.

There must be full traceability in both directions between the record for the chain sling and the component suppliers records. In the event of a query it is essential that you are able to identify the original certificates for the components used as they form a part of your Technical File. Full traceability is also an important aspect of the LEEA Technical Requirements.

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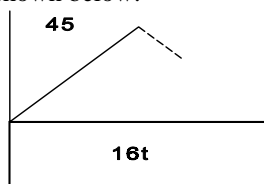
BS EN 818-4 is a harmonised European safety standard for grade 8 chain slings of both mechanically assembled and welded construction. Slings for general lifting service made to this standard meet the essential health and safety requirements of the European Machinery Directive. For slings assembled by mechanical joining devices, it makes some important changes that will affect the purchaser and user.

Rating and Marking

Size for size there are small changes to the working load limit (WLL) of some slings because of the way the calculated values are rounded. The main change the user will see is to the method of rating and marking multileg slings. In recent years, the normal method of rating has been the uniform load method by which the sling is given a WLL for a range of included angles between opposite legs. This is the only method permitted by BS EN 818-4 for general purpose chain slings but the range of angles is measured between the leg and the vertical instead of between opposite legs. Thus the typical marking for a two leg sling of say 16t WLL to BS EN 818-4 will be:

WLL 16t 0° - 45° instead of: WLL 16t 0° - 90°

Additionally or as an alternative, the range of angles and WLL may be shown by a pictograph on the identification tag, similar to that shown below:



There are good reasons for this change. The main ones are:

- (1) To emphasise that the angle of each leg affects the share of the load it will carry.
- (2) Three leg slings were an anomaly because they do not have an 'opposite' leg. Thus the 'included angle' was calculated as twice the angle to the vertical.

This may cause some confusion unless the slinger is made aware of the change. In the case of uniform load rated slings, this change does not affect the WLL of the sling, it just expresses it in a different way. The angle of the leg to the vertical, is half the previously used included angle.

Note: Although the uniform load method was introduced several years ago, some manufacturers continued to rate and mark multi-leg general purpose slings by the trigonometric method. Slings intended for general lifting service and marked this way will not comply with BS EN 818-4.

Existing Slings

This also raises the question of how a user, with existing slings rated by the uniform load method but marked with the 'included angle', will avoid confusion when he introduces new slings marked at the 'angle of inclination'. We recommend that the user should consider whether a programme of re-marking is worthwhile, bearing in mind the expected life of the slings.

Irrespective of whether existing slings are re-marked, there will inevitably be a period when both systems are in use. It should also be noted that as Harmonised European Standards are introduced for slings made of other materials, eg wire

rope and webbing, they will also adopt this method of rating and marking. We therefore further recommend that all slingers are made aware and trained to recognise the differences.

Documentation

Another noticeable change is to the documentation. In the past, legislation placed a duty on the user to obtain a test certificate before taking an item of lifting equipment into service. Although it was the user's responsibility to obtain this, it was the accepted practice for the manufacturer/supplier to issue a test certificate as a part of his service to the customer.

New legislation alters this requirement. The Supply of Machinery (Safety) Regulations 1992 require the manufacturer, or other responsible person, to issue an EC Declaration of Conformity and affix the CE mark to the item. In effect this is a statement by the manufacturer that he has taken all of the steps necessary and that the item complies fully with the requirements of the European Machinery Directive.

Mechanically assembled grade 8 chain slings, made in accordance with BS EN 818-4 do not have to be proof tested after assembly as all the components are verified to their respective standards. However the standard calls for the manufacturer to issue a 'Manufacturer's Certificate'. This has many similarities to the traditional test certificate, but does not contain details of any proof forces applied unless the complete sling is tested after assembly.

When the Supply of Machinery (Safety) Regulations were first introduced, most manufacturers adopted the practice of issuing the EC Declaration of Conformity and the Record of Test as a combined document. It is expected that manufacturers will now adopt the practice of issuing the Manufacturer's Certificate as a combined document with the EC Declaration of Conformity.

Obligations of Persons Purchasing Equipment for Others to Use at Work

The Provision and Use of Work equipment Regulations require that, when providing equipment for use at work, the purchaser obtains equipment complying with the relevant European Directives. In the case of grade 8 mechanically assembled chain slings, specifying BS EN 818-4 and requesting the EC Declaration of Conformity will ensure that the slings meet this requirement.

On receipt of the slings, check to ensure that the CE marking has been affixed by the manufacturer. If the CE marking has not been affixed, do not accept delivery of the sling. The EC Declaration of Conformity and the Manufacturer's Certificate, usually a combined single document, should be retained and treated in the same way that test certificates have been to date.

EC DECLARATION OF CONFORMITY AND MANUFACTURER'S CERTIFICATE

Description of the equipment *(This should include: a list of all component parts)
the nominal size of chain and grade mark 8)
the nominal length)*

Make / Type *(This should be the name of the system manufacturer and, if appropriate, the system name)*

Serial number / identification mark

Working load limit or limits *(For multi-leg slings this must be given for the range of angles 0° - 45° between the leg and the vertical. Optionally, if appropriate, it may also be given for the range of angles 45° - 60° between the leg and the vertical)*

The transposed harmonised standards used *(ie BS EN 818-4: 1997)*

The national standards or any technical specification used *(Not applicable unless you incorporate any components not covered by BS EN 818-4. If you do then the sling will not be fully to this standard and the hazards associated with those components must be addressed by you within your technical file)*

Business name and address of the manufacturer *(This should be the sling assembler not the system manufacturer)*

Declarations

I hereby declare that the above information is correct and that the equipment has been visually examined in accordance with the appropriate provisions and is found free from any defect likely to affect safety.

I hereby declare that the above machinery complies with the relevant essential health and safety requirements of the Machinery Directive

Signature

Name and address of the person making the above declarations
(For the purposes of the legislation implementing the Machinery Directive, this should be the 'individual person' and not the 'corporate person' ie not the company name)

Name of the competent person or establishment carrying out the visual examination
(For the purposes of BS EN 818-4, the person can be either the 'individual person' or the 'corporate person' ie it can be the company name)

Date the record is made

(Note: This model document complies with the requirements of both the Supply of Machinery (Safety) Regulations 1992 as amended in 1994 and BS EN 818-4: 1997. It is based on the model 'Record of Test and Thorough Examination of Lifting Plant and Equipment and EC Declaration of Conformity' published by the Association as document reference LEEA 019 dated 18.12.95. It therefore fulfills the obligations placed on the sling manufacturer by both the legislation and the standard. At the time of drafting, the Lifting Operations and Lifting Equipment Regulations have still not been published so their requirements are not yet confirmed. However from the information known to date, we are confident that this document will also meet in full the obligations placed on the purchasers and users in relation to records. The information given in italics does not form part of the document)