

General guidance on the safe use of container lifting lugs

Briefing Pamphlet #42



ICHCA
INTERNATIONAL

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1 | INTRODUCTION

Container lifting lugs are supplied in a variety of forms which offer the user a versatile and safe means of connecting a container to the lifting appliance. That is providing they are used in the correct manner and dangerous lifting practices are avoided. They are often, but must not be, confused with twist locks that are similar in construction, but have been designed solely for load restraint use, and as such are not suitable for lifting.

This Briefing Pamphlet has therefore been developed as means of offering a general guidance to the variety of container lifting lugs available and their safe use.

Note: this guidance applies only to lugs that have been designed for use with ISO container boxes to ISO 1161:1984 Series 1 freight containers – corner fittings – specification.

2 | STANDARDS AND LEGISLATION

Container lifting lugs are classified as lifting accessories and fall within the scope of The Supply of Machinery (Safety) Regulations 2008.

Once in service, container lifting lugs fall under (in the EU for example) the Provision of Use of Work Equipment Regulations (PUWER) and the Lifting Operations and Lifting Equipment Regulations (LOLER).

Lifting twist locks are covered by BS 5237:1985 which specifies dimensions, materials, test

requirements and marking for fixed and floating centre twist lock heads, and adjacent portions of the shank, used in lifting frames to lift freight containers or other equipment fitted with ISO corner fittings.

Whilst reference in this Briefing Pamphlet is made to various European Machinery Directives, regulations and British and European Standards, it must be borne in mind that these may not be relevant in other regions and/or they will have similar standards in place. However this does not detract from the general guidance contained herein.

3 | TYPES OF CONTAINER LUGS

There are a wide range of container lugs on the market and this guidance has been developed around the most common of these. It shall be noted that these guidance notes must also be read in conjunction with the manufacturer's instructions for use, that are supplied with the equipment.

3.1 Top Lifting Lugs

As the name suggests these lugs are designed to be fitted to the top of an ISO corner casting. They are generally designed such that they can be inserted into the slot on the top of the corner casting, then to secure they are twisted through 90 degrees and retained by a locking device. This particular type is commonly designed to be fitted to a vertical sling, therefore using this method of connecting the load to the appliance will also require some sort of lifting frame and sling assembly. See figure 1 for a typical example of a top lifting lug.



Figure 1: Typical top lifting lug (yellow)

Note: with certain types and/or size of container it is not permitted to use this method of lifting. For further guidance refer to ISO 3874 tables 1, 2, and 3.

3.2 Top or Bottom Side Lifting Lugs

These items are designed to fit into the side of the ISO corner castings. Some are designed specifically for the side of the top corner casting, some for the bottom corner casting and others can be fitted in either. Their shape allows them to be fitted into the ISO corner casting side slot. Once fitted they are usually attached to one leg of a 2 leg sling. The lug is rotated in the ISO corner casting to the angle of the sling and a spring loaded pin locks it in place, see figure 2 for a typical example.



Figures 2 & 3: Typical Side Lifting Lugs, showing top and bottom arrangements.

Note: with certain types and/or size of container it is not permitted to use this method of lifting. For further guidance refer to tables 1, 2, and 5 of ISO 3874

3.3 Attaching the container lugs to the load and crane

The connection of a container lug is always by means of a key that is inserted into one of the slots of an ISO container casting. The key is then rotated through 90 degrees, such that it cannot be pulled out of the slot in the opposite direction to which it was inserted without rotating it. If there is potential for the key to rotate uncontrolled whilst in this position, then means must be provided to lock the key in the lifting position.

To connect the container lugs to the crane, use of other lifting accessories will be required and the type will depend on the type of lug being used, as the following sections will explain.

3.3.1 Attaching the top container lugs to the load and crane

The method of connection to the load is generally as described in 3.3. However, since it is possible for the upper lug to move after being twisted into position, then it is vital that a locking device is used to secure it in place. Usually such a locking device is an integral drop down pin that acts as a wedge in the socket, which prevents rotation until it is removed.

This type of container lifting lug is designed to be lifted from the vertical with an allowable tolerance of 15 degrees about the axis of the eye only, see figure 3. This means that they must be used in conjunction with a lifting frame and sling set. It is also recommended that the vertical slings on the frame are connected to the lug by means of a shackle with a nut, bolt and cotter pin to prevent shackle pin coming loose during the lifting operation.



Figure 4: Top lug lifting tolerance

Note: this type of lug is not to be used with a 4 leg sling.

It is also important to note that a shackle can only be loaded at an angle about the pin axis and therefore the shackle and container eye cannot be loaded to the side as this will put undue stress in the equipment, refer to figure 5.

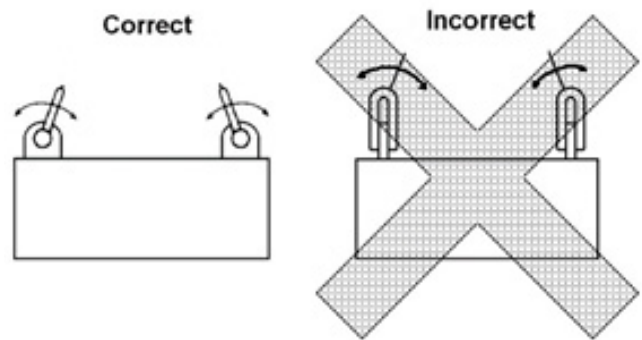


Figure 5: correct and incorrect shackle loading

To avoid eccentric loading of the shackle, a loose spacer should be placed either side of the container lug, or a shackle with a smaller jaw width should be used. If a smaller shackle is used, ensure that the angle from the vertical is considered as this will increase the applied load.

Note: For further guidance on the slings, lifting frame and shackles refer to the [Code Of Practice For The Safe Use Of Lifting Equipment - Edition 8 \(Revised - 2015\)](#). Additional guidance on lifting frames can be found in LEEA 055 The Verification of Spreader Beams, Lifting Beams and Lifting Frames. Both of the documents are published by: Lifting Equipment Engineers' Association

3.3.2 Attaching the side container lugs to load and the crane

The method of connection to the load is generally as described in 3.3. However, since it is possible for the lug to move after being twisted into position, i.e. in the event of a slack sling leg, then it is vital that a locking device is used to secure it in place. Usually such a locking device is an integral spring actuated pin that acts as a wedge in the socket, which prevents rotation until it is released.

Most side container lugs can be used with vertical slings as described in 3.3.1, but they may also be used in conjunction with a sling at an angle. However, reference should be made to the manufacturers instructions as there are some devices on the market that impose restrictions on the angle from the vertical. It is important to note that as the angle from the vertical increases then so does the load on the container lug. Therefore, the manufacturers load tables should be referred to in order to determine the maximum carrying capacity for the sling arrangement.

As with the top lifting lug, these lugs cannot be used with a 4 leg sling. Therefore, pairs, comprising

a right and left handed lug, are connected to a lifting beam via a 2 leg sling arrangement. The lug may also be connected to the sling by means of a shackle, but some are also designed to allow for connection by means of the hook and safety catch, but this should be confirmed by reference to the manufacturer's instructions for use.

Note: For further guidance on the slings, lifting frame and shackles refer to the Code of practice for the Safe Use of Lifting Equipment. Additional guidance on lifting frames can be found in LEEA 055 The Verification of Spreader Beams, Lifting Beams and Lifting Frames. Both of the documents are published by: Lifting Equipment Engineers' Association

4 | STORAGE AND HANDLING

It is recommended that wherever practicable, lifting lugs are not left in-situ, but should be removed after use and returned to proper storage. This storage area should be dry, free from injurious pollution and extremes of temperature.

5 | INSPECTION, MAINTENANCE AND THOROUGH EXAMINATION

In the EU, by way of example, (other similar regulations exist elsewhere) all lifting container lifting lugs fall within scope of LOLER and PUWER, which require the lugs to undergo routine inspection, maintenance and thorough examination, as the following sections explain.

5.1 Inspection

In addition to the thorough examination necessary under statutory provisions, all container lifting lugs should be visually inspected by a responsible person prior to use or on a regular basis, taking into account of the conditions of service. This inspection must be carried out with the container lug in a reasonably clean condition and in adequate lighting. If any of the following defects are present, the container lug should be withdrawn from service and referred to a Competent Person:

- distortion, such as bent shank or deformed eye;
- loss of section through excessive wear;
- damage such as nicks, cracks, gouges, corrosion;
- missing or illegible markings, such as the SWL, unique id, etc.

Note: Under NO circumstances should bent container lugs be straightened.

5.2 Maintenance

Maintenance of these items is low and would normally focus on the locking mechanism, however it is often more cost effective and safer to replace defective container lifting lugs rather than attempt a repair.

5.3 Thorough examination

Container lifting lugs should only be examined by a Competent Person who has such appropriate practical and theoretical knowledge and experience of the lifting equipment to be thoroughly examined as will enable them to detect defects or weaknesses and to assess their importance in relation to the safety and continued use of the lifting equipment.

6 | DOCUMENTATION AND MARKING

Container lifting lugs are classed as lifting accessories within the scope of the supply of machinery safety regulations, which places obligations on the manufacturer to mark specific information on the product and supply it with defined documentation.

6.1 EC Declaration of Conformity and Instructions for use

For container lifting lugs these are the only documents that are required by legislation in the EU, other requirements will exist elsewhere.

6.1.1 EC Declaration of Conformity

The EC Declaration of Conformity must contain the following information:

- The name and address of the manufacturer
- The name and address of the manufacturers authorised representative
- The name and address of the person responsible for compiling the technical file
- Description of the equipment, type, serial number and WLL
- The standards and specifications used
- The place and date of the declaration

- A declaration claiming conformance with the essential health and safety requirements as defined in the directive 2006/42/EC
- Name, position and signature of the person making the declaration

6.1.2 Instructions for use

Container Lifting Lugs must be supplied with instructions for use which must contain the following minimum information:

- Business name and full address of the manufacturer
- The EC Declaration of Conformity or the contents of the EC Declaration of Conformity, showing the particulars of the container lifting lug, without the serial number and signatures
- A general description of the container lifting lug
- Drawings, diagrams, descriptions and explanations necessary for the assembly, use, maintenance and repair of the container lifting lug
- A description of the intended use of the container lifting lug
- Limits of use
- Instructions for first use of the container lifting lug
- Instructions regarding the need for training users

- Information regarding residual risks that may remain despite inherent safe design
- The conditions in which the lug meets the requirements for stability during use
- A description of the maintenance operations that should be carried out by the user and the preventative maintenance measures that should be observed
- The specifications of the spare parts that should be used, when these affect the health and safety of the operators
- The static test coefficient used

Note: Refer to LEEA 062 General guidance to the Manufacturer of Lifting Equipment to the Development of Instructions for Use.

6.2 Marking

The container lifting lug must be marked with the following minimum information:

- The name and address of the manufacturer
- The CE mark (if applicable)
- The serial number
- Year of construction
- Maximum working load in tonnes or kilograms

7 | TRAINING

7.1 Training of Operatives

Operative training shall be in accordance with section 1.9 of the LEEA Code of Practice for the Safe Use of Lifting Equipment. However, in addition to this the operative training should take the manufacturer's instructions into account, paying particular attention to the following:

- Operatives should be familiar with the type of container corner casting and the appropriate holes for the type of lifting lug being used.
- Operatives should be shown the correct method of fitting and use of locking devices.

- Operatives should be shown the correct method of attachment to other lifting gear.
- Operatives should understand the rating of lifting lugs for angular loading.
- Operatives should understand the limitations of use with certain container types and sizes. (ISO 3874 tables 1, 2, 3 and 5).



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