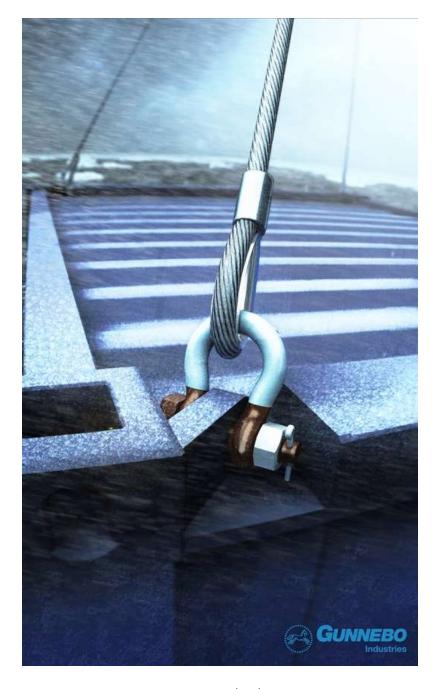
GUNNEBO LIFTING SHACKLES

USER'S INSTRUCTIONS AND EC DECLARATION OF CONFORMITY



Original instructions according to Directive 2006/42/EC on machinery, section 1.7.4 <u>Instructions</u>, and Annex II.1.A. <u>EC Declaration of Conformity of the Machinery</u>.

These instructions also meet the demands of the standard EN 13889:2003+A1:2008, Forged steel shackles for general lifting purposes.



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Revision history:

10.11.2015 User instructions approved for release.

28.02.2017 Additional text added to chapter 7.



1. EC Declaration of Conformity

Numbers in parenthesis refers to the list of requirements detailed in Directive 2006/42/EC on machinery, Annex II.1.A.

Business name and full address of the manufacturer (1):	Gunnebo-Anja Industrier AS, NO-5282 Lonevaag, Norway. E-mail: sales@gunneboindustrier.no Web: www.gunnebolifting.com
Name and address of the person authorised to compile the technical file (2):	Cf. (1) and (10).
Description and identification of the machinery (3):	Gunnebo lifting shackles type 735, 755, 831, 834, 835, 851, 854, 855, 856, 858, 860, 861, 1577, 1619 (cf. manufacturer's website for drawings og tables of dimensions).
Declaration (4):	It is hereby declared that Gunnebo lifting shackles as specified above (3) fulfills all the relevant provisions of Directive 2006/42/EC on machinery.
Name, address and identification number of the notified body which carried out the EC type-examination (6):	Nemko AS, Gaustadalléen 30, NO-0373 Oslo, Norway. Identification number: Norsk Akkreditering MSYS 001.
Standards and specifications used (7+8):	EN 13889:2003+A1:2008; US Fed. Spec. RR-C-271; SMS 1577; SMS 1619; DNV 2-7.1.
Place and date of the declaration (9):	Lonevaag, Norway, 20. February 2015
Identity and signature of the person empowered to draw up the declaration on behalf of the manufacturer (10):	Audun Seilen Audun Seilen Quality Manager Gunnebo-Anja Industrier AS



2. General description

This user's manual is valid for all CE-marked shackles manufactured by Gunnebo Industries. <u>GUNNEBO</u> or <u>GL</u> is stamped on the shackle bow.

3. Intended use

Gunnebo lifting shackles are intended for use in controlled lifting operations, performed and supervised by qualified and competent personnel. Shackles can also be used as a connecting component in different constructions, provided that the necessary technical calculations have been taken, with regards to load and environmental factors. The instructions herein primarily covers use of shackles for lifting.

4. Inspection prior to use

Prior to use, the shackle must be thoroughly inspected to verify that:

- all markings on the body and the pin of the shackle are readable and in compliance with the relevant Test Certificate,
- the shackle pin is of the correct type,
- the body and pin shall not be distorted or unduly worn, and
- the body and pin are free from nicks, cracks, grooves and corrosion.

If there is any doubt with regards to the above criteria being met, the shackle should not be used for a lifting operation.



5. Assembly

It is important to ensure that the pin is safely locked after assembly. For repeated lifting between inspection of the gear, it is recommended to use a safety bolt type shackle with nut and split-pin – the user must than make sure that the split-pin ensure appropriate safely against unscrewing the nut.

Shackles with safety bolt (e.g. type 855) should not be tightened in a way that prevents the bolt from rotating freely. In most cases, hand-tightening will be sufficient.

Screw pin shackles (e.g. type 854) should be assembled so that the collar is flush with the shackle body, and the threads are fully engaged. A suitable tool (such as a wrench, pin punch or screwdriver) can be used to achieve sufficient force.

The picture below shows an 854 shackle with screw pin and pin punch as tightening tool, next to an 855 shackle with rotating safety bolt with cotter pin.

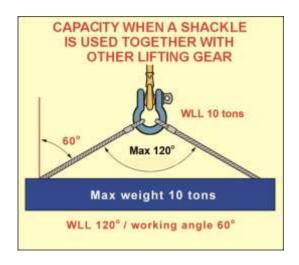




Shackles designed for ROV operations (i.e., type 860, 861 and 863) come with special bolts. There is a separate set of instructions for shackle type 863 ROV Release.

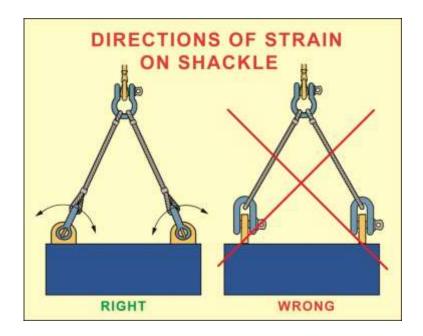
6. Use of shackles with multi-leg slings

When using shackles in conjunction with multi-leg slings, due consideration should be given to the effect of the angle between the sling legs. The stated WLL is valid for leg angles up to 120°. Larger leg angles should be avoided.



When the shackle is fitted to a lifting lug, ensure that the shackle can rotate freely around the axis of the shackle bolt – see illustration on next page.





When fitting shackles together with polyester lifting slings, ensure that the contact diameter is according to the sling manufacturer's recommendations. If necessary, one should use a bushing on the shackle bolt to achieve the necessary contact diameter.

If two shackles are fitted together, it is generally recommended to connect the bows.

For further recommendations regarding safe use of lifting shackles, the user may refer to EN 13889, Annex A.

The illustrations in section # 6 are taken from the book *Sikker bruk av løfteredskap (Safe Use of Lifting Equipment)*, and are used with the publisher's permission (www.Lsi-bok.no).



7. Marking

Gunnebo lifting shackles conforming to EN 13889 and/or US Fed. Spec. RR-C-271 have the following marking:

On the bow:

- WLL in Tonne,
- material grade (6 or 8),
- manufacturer identification (GUNNEBO or GL),
- CE mark,
- batch/traceability code,
- bow dimension in inches.

On the bolt:

- Country of origin code (NOR),
- manufacturer identification (GL),
- material grade (6 or 8),
- batch/traceability code.

Shackles with WLL < 2T are only marked with material grade on the bolt (in acc. with EN 13889).



Example of marking, shackle type 855, WLL 12T, batch XXX-XXX:

Bow: WLL 12,0T – 6 GUNNEBO CE XXX 1 1/4 Bolt: NOR GL-6 XXX



<u>Serial numbers / unique ID marking:</u> Gunnebo lifting shackles can be delivered from the factory with serial numbers / unique ID marking. The marking is engraved into the shackle bow, usually as an ascending digit series.



Colour coding: Some of Gunnebo's lifting shackles are colour coded on the bow for ease of identification. Type 856 Arctic has red-brown colour on the lower part of the bow, and type 858 Super has red-brown colour on the upper part of the bow. ROV shackles (type 860, 861, and 863) have orange high-visibility colour at the top of the bow (as well as the bolt grip).



Adding marking to shackles: Adding marking to shackles (such as project code, serialization etc.) must be done in a way that does not reduce the shackle's strength or corrosion resistance, or the legibility of the manufacturer's own marking. Provided these conditions are met, we recommend the following methods of marking:

- marking tape
- engraving tool
- low stress punches

Note that shackles can be provided (at an additional cost) with special marking directly from the manufacturer.



8. Certificates

Shackles can be used for lifting only when the user has a valid certificate. Gunnebo lifting shackles are supplied with a manufacturer's certificate acc. to EN 13889:2003 and a 3.1 material certificate acc. to EN 10204:2004. Authorised resellers may provide their own documentation, but will be able to provide the original certificates upon request.

9. Periodic thorough examination by a competent person

Gunnebo recommends that lifting shackles be thoroughly examined regularly by a compentent person. As a general rule, this inspection should be carried out at least once a year (12 months interval). Shorter inspection intervals are required when a shackle

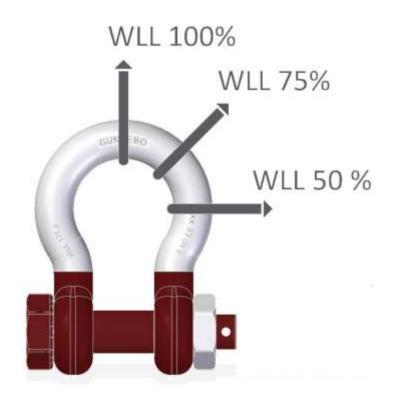
- has not been in use for the last 6 months or longer,
- is used in demanding (e.g. corrosive or extreme temperature)
 environments ,
- is subjected to repeated loads that may induce metal fatigue.

Local/national/branch-specific/etc. regulation may specify shorter inspection intervals.



10. Warnings and limits of use

<u>Asymmetrical loading:</u> Shackles are designed to carry the load at the center/bottom of the bow, and evenly distributed on the shackle bolt. Asymmetrical loading or side loading will reduce the shackle's load capacity. Cf. illustration below.



<u>Deformation:</u> A poor-fitting shackle bow-bolt assembly may be due to misalignment or deformations. Any such shackle should be presented to a competent authority (i.e. dealer, manufacturer)

<u>Chemicals:</u> Shackles must not be exposed to acids, acid fumes or other corrosive chemicals.



<u>Modifications</u>: Modifications of a shackle that may affect its material or load bearing properties are not permitted.

<u>Load distribution:</u> It is generally recommended that the load be distributed evenly across the length of the shackle bolt.

Should point-loading be unavoidable, it should be centered on the bolt to avoid eccentric loading. However, under no circumstances should the opening be forced together, or parts be welded onto the bolt to facilitate centering of the load.

<u>Wear:</u> Shackles with more than 10% wear of the bow or bolt diameter should be discarded. Original diameter is listed in dimension tables in the manufacturer's product catalogue and on the manufacturer's website.

Extreme temperature: Shackles must not be heat treated (e.g. through welding). The general service temperature is -20° til +200° Celcius (some shackle types are approved for use in temperatures down to -40°, contact the manufacturer or dealer for information). For temperatures higher than +200° C, the following apply:

Service temperature	New load capacity in % of original WLL
200-300° C	90%
300-400° C	75%
> 400° C	not allowed

<u>Unstable load, shock load:</u> Lifting operations wherein the load is unstable should be avoided. In particular, shackles should not be subjected to shock loads.



<u>Fatigue:</u> It is important to realize that fatigue failure can occur even if the shackle's WLL has not been exceeded. Scenarios in which the shackle is subjected to variable load over a prolonged period of time, will carry the risk of inducing fatigue. Consider this when choosing shackle type/dimension, and deciding service intervals.

Replacing a lost or damaged shackle bolt: Generally, it is recommended to use only the original bow-bolt combination. In most cases, if a shackle bolt fails to meet the approval criteria, the whole shackle should be discarded. The manufacturer will not issue a certificate on a non-original combination of bow and bolt.

11. Definitions

WLL: Working Load Limit. The maximum working load a lifting accessory or lifting assembly can be subjected to. For shackles the stated WLL is valid when the shackle is loaded in a straight direction (cf. paragraph 10 on asymmetrical loading above). Shackles that are not marked with WLL must not be used for lifting (however, older shackles may carry the designation SWL – Safe Working Load).