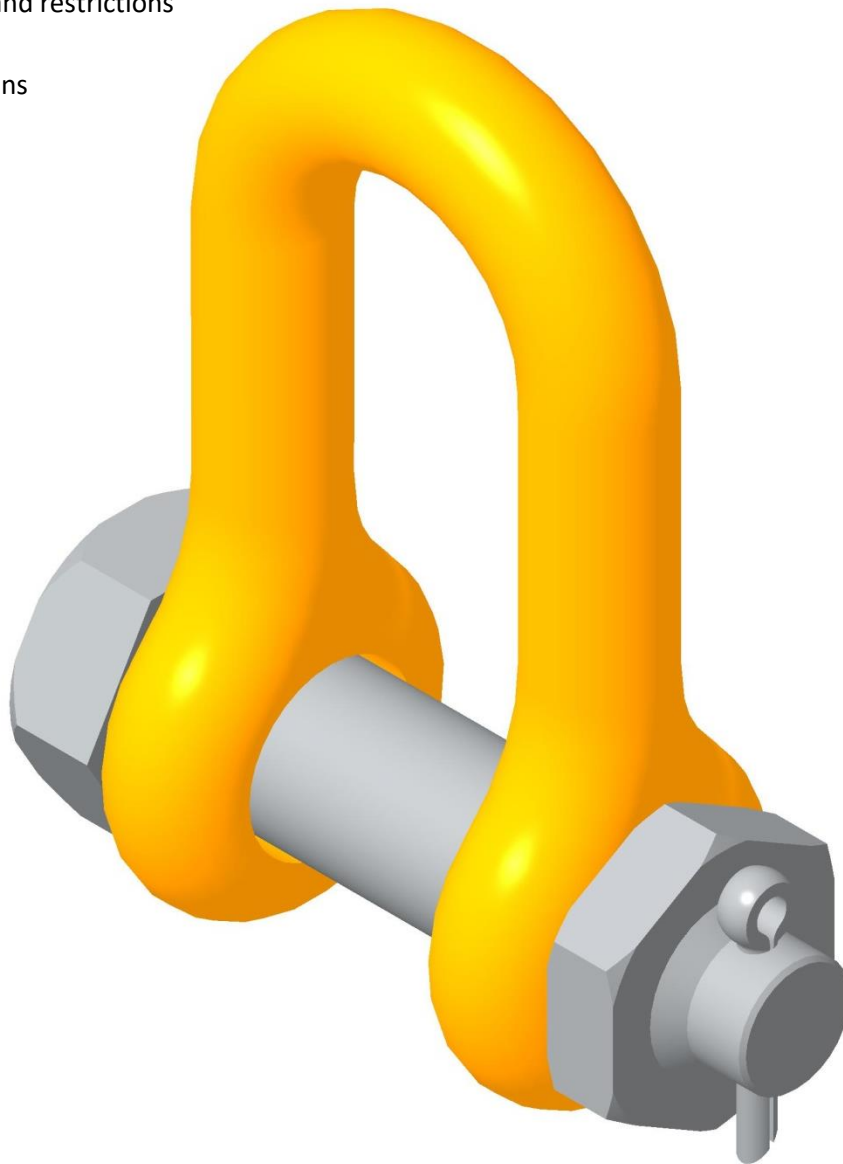


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User manual for Shackle SA Classic

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1. Introduction and EC declaration

This manual is an original instruction in accordance with Directive 2006/42/EC on machinery section 1.7.4 Instructions and Annex II Declarations. It also meets the requirements in standard EN 1677-1:2000+A1:2008 Components for slings – Safety – Part 1: Forged steel components, Grade 8.

This manual is valid for the following products: SA-7/8-8, SA-10-8, SA-13-8, SA-16-8, SA-19-8, SA-22-8 and SA-26-8.

This manual is valid in addition to Gunnebo Industries' instruction for slings.

Both manuals are continuously updated and are only valid in its latest version, which can be downloaded from www.gunneboindustries.com.

EC declaration of conformity and incorporation

Authorized person to compile the technical file:
Özkan Kosmaz

We declare that the CE-marked products described in this user manual fulfil all the relevant provisions of the Directive 2006/42/EC.

The products can be incorporated as part/s of a CE-marked lifting assembly but must in that case not be put into service until the final lifting assembly has been declared in conformity with the provisions of the Directive 2006/42/EC.

Our quality management system complies with ISO 9001:2015 and is certified by LRQA Sverige AB for and on behalf of Lloyd's Register Quality Assurance Limited (certificate identity number: 10140613).

Information about what harmonized and national standards/technical specifications that are applied as well as the valid version of this user instruction are available at www.gunneboindustries.com.

If the products are modified without approval from Gunnebo Industries, this declaration becomes invalid.

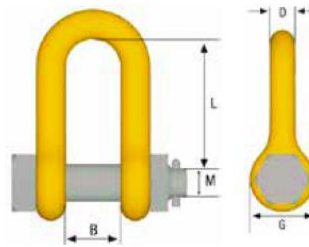
Växjö, August 29.th 2019



R&D Manager: Özkan Kosmaz

2. General description

The SA shackle is a lifting shackle consisting of a U-shaped body, a bolt, a nut and a safety cotter pin.



The SA shackle is designed, manufactured and tested to be a sling component in accordance to EN 1677-1. Type tests include deformation test, static tensile test and fatigue test. Gunnebo Industries manufacturing test regime includes proof loading 100% of the lot.

The SA shackle is marked as follows.

On the bow:

- manufacturer identification (GBO or GBO SWE)
- product name, size and material grade (8)
- CE mark
- WLL¹ in tonnes
- batch/traceability code²

On the bolt:

- material grade (8)
- batch/traceability code

Detailed technical data as dimensions, working load limits (WLL) etc. can be downloaded from www.gunneboindustries.com.

Shackles can be used for lifting only when the user has a valid certificate. Gunnebo Industries issues a manufacturer's certificate according to EN 1677-1 and a 3.1 material certificate acc. to EN 10204. Authorized resellers may provide their own documentation, but will be able to provide the original certificates upon request.

¹ The maximum working load a lifting accessory or lifting assembly can be subjected to. For the SA shackle the stated WLL is valid when the shackle is loaded in a straight direction.

² The traceability code consists of letters and numbers that identifies exactly which plant the product was made in, the year and the batch. This gives the ability to trace the product back through the manufacturing process, all the way back to the specific raw material.

3. Intended use and restrictions

Intended use

Bolt, nut, and cotter pin type shackles like the SA Shackle provide the most secure pin (bolt) arrangement. They are suitable for applications where the shackle is semi-permanent with infrequent removal.

The SA range is designed to be a sling component and applies to the normal sizes and WLLs for grade 8 chain slings according to EN 818-4. The SA Shackle can also be used in steel wire rope slings and textile slings.

The SA shackle can be used as an end component in slings or lugs.

It 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.

This instruction primarily covers use of shackles for lifting.

General limitations in the use of the SA Shackle

- Never modify, repair or reshape the product by welding, heating or bending as this will affect the nominal WLL.
- Never heat treat the product as this may affect the WLL.
- The product must not be galvanized or subject to any plating process without the approval of the manufacturer.
- The product must not be used in alkaline or acidic conditions.
- The product must not be exposed to aggressive chemicals, acids and vapours.

Use in exceptionally hazardous conditions

The rating of lifting accessories in European Standards assumes the absence of exceptionally hazardous conditions. Exceptionally hazardous conditions include offshore activities, the lifting of persons and lifting of potentially dangerous loads such as molten metals, corrosive materials or fissile materials. In such cases the degree of hazard should be assessed by a competent person and the working load limit adjusted accordingly.

WLL reduction at elevated temperatures

The general service temperature is -40 °C to +200 °C. 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

If the service temperature exceeds 200 °C, the corrosion protection of the bolt will be lost.

Side loading is not allowed

The SA shackle is designed to carry the load at the center/bottom of the bow, and evenly distributed on the shackle bolt.

Fatigue

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 dimensioning and deciding service intervals.

Additional marking

If markings such as project code, serial number etc. are added it must be done in a way that does not reduce the shackles strength, 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 or low stress punches.

4. Assembly

When the SA product is incorporated as a part of a sling it must be part of the certification and WLL rating of the complete sling.

The assembly of the SA shackle may only be executed by a qualified person.

When assembling the SA shackle observe the following:

- Verify that all markings are readable and that all parts of the shackle are of the correct type and size.
- The bolt should not be tightened in a way that prevents the bolt from rotating freely. In most cases, hand tightening will be sufficient.
- Ensure that the bolt and nut is properly secured with the safety cotter pin attached. A poor-fitting between the shackle bow and bolt may be due to the bolt being bent, damaged threads or misalignment of the bolt holes. Under these circumstances the schackel must not be used.

5. User instructions

The SA shackle is only to be used after reading and understanding this manual.

For further recommendations regarding safe use of the shackle in sling applications, the user is referred to Gunnebo Industries' instruction for safe use of slings.

Verification prior to first use

Before first use ensure that:

- the SA Shackle is precisely as ordered.
- the manufacturer's certificate is in order.
- the identification and working load limit marking on the SA Shackle correspond to the information on the certificate.
- full details of the shackle are recorded.

Inspection prior to each use

Before each use the SA Shackle must be inspected for obvious damage or deterioration.

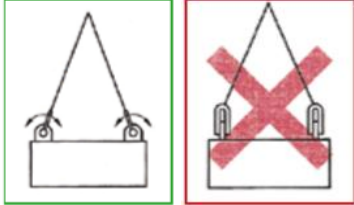
The inspection should be done in accordance with local regulations but the items listed in section 6 Inspection should as a minimum always be controlled. If there is any doubt with regards to these criteria being met, the shackle must not be used for a lifting operation.

Before loading

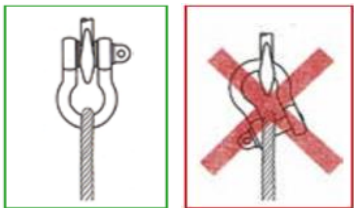
- Know the weight of the load and the centre of gravity.
- Check the conformity of the load with the WLL of the lifting equipment for the specific working configuration.
- Ensure that the SA shackle has been correctly assembled in accordance with section 4.
- Ensure that no obstacles will obstruct the lift and prepare the landing site.

General instructions for safe use

- Avoid side loading
The SA shackle should be fitted to the load in a manner that allows the shackle body to take the load in a true line along its centreline to avoid undue bending stresses which will reduce the load capacity of the shackle.



- Avoid eccentric load distribution
It is recommended to distribute the load evenly across the total length of the shackle bolt. Loose distance spacers may be used on both ends of the bolt. However, under no circumstances should the opening be forced together, or parts be welded onto the bolt to facilitate centering of the load. Such actions will have a negative impact on the shackles mechanical properties.



- Avoid unstable loads



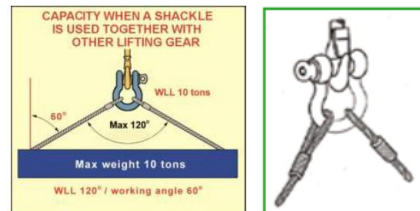
- Avoid contact with sharp edges that could damage the shackle.

Avoid rotation of the shackle bolt
Avoid applications where, due to load movement, the shackle bolt can roll and possibly unscrew.

- When securing the load, the bow of the shackle should be put into the running side of a choke.



- Use of shackle with multi-leg slings
Multiple sling legs should be applied to the shackle body. 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.



The illustration to the left is 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).

- Use of two connecting shackles
If two shackles are fitted together, it is generally recommended to connect the bows.
- Use of shackle with fiber and textile slings
When fitting shackles together with fiber and textile lifting slings, ensure that the contact diameter is according to the sling manufacturer's recommendations. If necessary, use a bushing on the shackle bolt to achieve the necessary contact diameter.
- Hoisting effect
When a shackle is used to secure the top block of a set of rope blocks the load on this shackle is increased by the value of the hoisting effect.

End of use/Disposal

The SA shackle shackles shall be sorted / scrapped as general steel scrap.

6. Maintenance

Inspection

During service lifting equipment are subjected to conditions which affect their safety. It is therefore necessary to ensure that the equipment should be safe for continued use.

The SA shackle should be withdrawn from service and referred to a competent person for thorough examination if any of the following are observed:

- The schackle markings are illegible, i.e. information about the identification and/or the working load limit.
- More than 10% reduction of the original bow or bolt diameter dimension at any point.
- Incomplete bolt engagement.
- The threads of the bolt and/or the shackle body are damaged.
- Cuts, nicks, gouges, cracks, excessive pitting or corrosion, heat discoloration, bent or distorted components or any other defects.

Thorough examination

A thorough examination should be carried out by a competent person at intervals not exceeding six months. The inspection interval should be less where deemed necessary taking into consideration:

- local-, national-, or branch-specific regulation.
- the service condition of the shackle.
- eventual use in demanding environments (e.g. corrosive or extreme temperature).
- eventual use where the shackle is subjected to repeated loads that may induce metal fatigue.

Records of such examinations should be maintained.

Prior to the examination the SA Shackle should be cleaned so it is free from oil, dirt and rust. Any cleaning method which does not damage the parent metal is acceptable. Methods to avoid are those using acids, overheating, removal of metal or movement of metal which may cover cracks or surface defects.

Repair

Repairs must only be done by a competent person who has the knowledge and technical skills. The shackle shall only be returned to service after approval by a designated person.

Records of repairs should be maintained.

Any replacement component or part of the chain sling should be in accordance with the appropriate European Standard for that component or part. Use only original Gunnebo spare parts.

Components that are cracked, visibly distorted or twisted, severely corroded or have deposits which cannot be removed should be discarded and replaced.

Minor damage such as nicks and gouges may be removed by careful grinding or filing. The surface should blend smoothly into the adjacent material without abrupt change of section. The complete removal of the damage should not reduce the thickness of the section at that point to less than the manufacturer's specified minimum dimensions or by more than 10 % of nominal thickness of the section.