



Applications

Shackles are used in lifting and static systems as removable links to connect (steel) wire rope, chain and other fittings. Screw pin shackles are used mainly for non-permanent applications. Safety bolt shackles are used for long-term or permanent applications or where the load may slide on the pin causing rotation of the pin.

Chain or dee shackles are mainly used on one-leg systems whereas anchor or bow shackles are mainly used on multi-leg systems.

Range

Van Beest offers a wide range of bow and dee shackles, depending on the application on which the shackle is going to be used; the range stretches from Working Load Limit (WLL) 0.33 tons to 1500 tons. Therefore, our customers have a very extensive range to choose the shackle exactly suitable for the application. Most of the shackles are directly available from stock. Furthermore, shackles can be supplied to many standards such as the US Federal Specification RR-C-271, EN 13889, British Standard 3032, DIN 82101, DIN 82016 etc.

Polar shackles are for use in extreme climatic conditions with material properties guaranteed up to temperatures of -40°C, and furthermore we offer a wide range of general commercial shackles, which are not suitable for lifting but merely for fixing purposes.

Design

All Van Beest shackles have a specific design for a specific application. Examples are the "Super" shackles which are made out of grade 8 steel enabling the dimensions of the shackles to be minimized for use in limited space conditions, without loss of functionality or Working Load Limit.

Or sling shackles for use with large slings, to provide a better radius to the sling being used. Another example of functional design is the use of shackles where the pin has a square sunken hole so as not to obstruct the use of fishing nets. These are all examples of a highly functional design, to optimize the use of the Van Beest shackles in daily use.

Furthermore, shackles used for lifting applications are stamped with the following marks, to specify the quality and safety of use of the shackles:

- | | |
|----------------------------------------|-------------------------------------------------------------|
| - Working Load Limit | ■ i.e. WLL 25 T |
| - manufacturer's identification symbol | ■ i.e. GP, indicating Green Pin or Bs, indicating Van Beest |
| - traceability code | ■ i.e. HA pertaining to a particular batch |
| - steel grade | ■ i.e. 4, 6, 8 |
| - CE conformity code | ■ i.e. CE, Conformité Européen |

Van Beest Green Pin® shackles meet all relevant requirements of the Machinery Directive 2006/42/EC and all latest amendments.

CAD drawings

Green Pin® shackles are used in a wide variety of applications; from a simple lift to move an item from A to B in a workplace, to very complex lifting systems for offshore applications. In the latter case, engineers use computer programs like AutoCAD to develop a 2D or 3D specification of the entire system.

For standard products usually a CAD drawing library is used. The use of these kind of libraries saves considerable design time and costs. And of course it prevents mistakes that may occur whilst copying data from a product catalogue into the design program.

To help the engineers, Van Beest have made their shackle drawings available in various formats. These drawings can be integrated in almost every design program.

Currently there are drawings available for Green Pin® Standard, Polar, Super, Sling and Heavy Duty shackles. Product designs are available in various formats, like: DWG, IGES, PDF, SAT and STEP.

The drawings can be downloaded from our server. Please contact our sales department to receive the download instructions.

Finish

Shackles supplied by Van Beest can be either hot dipped galvanized, electro-galvanized, painted or self coloured, depending on the type of shackle and its application.

You can find the finish of each type of shackle in the product section further on.



Certification

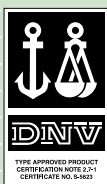
Upon request at time of order, all load rated shackles can be supplied with any of the following documents or certificates:

- works certificate in accordance with EN 10204 - 2.1;
- material certificate in accordance with EN 10204 - 3.1;
- manufacturer test certificate;
- EC Declaration of Conformity in accordance with annex IIA of the machine directive 2006/42/EC;
- proof load test certificate;
- certificate with the actual breaking load experienced on tested samples;
- test report of Magnetic Particle Inspection (M.P.I.);
- test report of Ultrasonic Inspection (U.S.).

The first four of the above mentioned certificates can be supplied at no extra charge. For all other certificates, additional costs will be charged.

The test certificates can be supplied surveyed by all official classification societies, such as Lloyd's, Det Norske Veritas, British Standards Bureau, American Bureau of Shipping, Germanischer Lloyd's or any other officially certified inspection body.

Green Pin® Standard Shackles and Green Pin® Polar Shackles are DNV type approved to certification Note 2.7-1, lifting sets for offshore containers.



Instructions for use

Shackles should be inspected before use to ensure that:

- all markings are legible;
- the body and pin are both identifiable as being of the same size, type and make;
- the threads of the pin and the body are undamaged;
- never use a safety bolt type shackle without using a securing pin;
- the body and the pin are not distorted or unduly worn;
- the body and pin are free from nicks, gouges, cracks and corrosion;
- shackles may not be heat treated as this may affect their Working Load Limit;
- never modify, repair or reshape a shackle by machining, welding, heating or bending as this will affect the Working Load Limit.

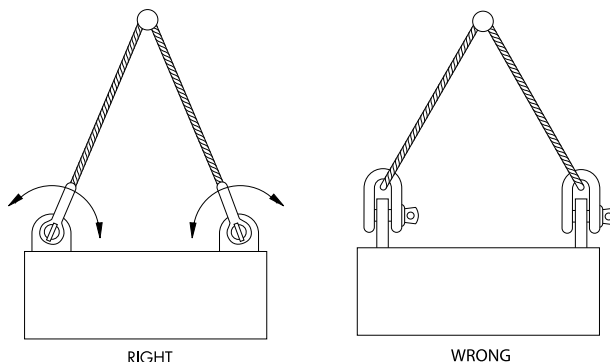
Assembly

Ensure that the pin is correctly screwed into the shackle eye, i.e. tighten hand-tight, then secure using a wrench or other suitable tool so that the collar of the pin is fully seated on the shackle eye. Ensure that the pin is of the correct length so that it penetrates the full depth of the screwed eye and allows the collar of the pin to seat on the surface of the shackle eye.

Incorrect seating of the pin may be due to a bent pin, too tight fitting thread or misalignment of the pin holes. Do not use the shackle under these circumstances. Never replace a shackle pin except with one of the same size, type and make as it may not be suitable for the loads imposed.

Select the correct type of shackle and its Working Load Limit for the particular application. Should extreme circumstances or shock loading be applicable, this must be well taken into account on selecting the correct shackle. Please note that commercial shackles are not to be used for lifting applications.

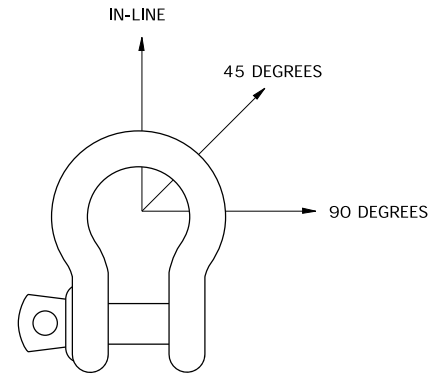
Make sure that the shackle is supporting the load correctly, i.e. along the axis of the shackle body centreline, avoid introduction of bending loads, unstable loads and do not apply overloads.



Side loads

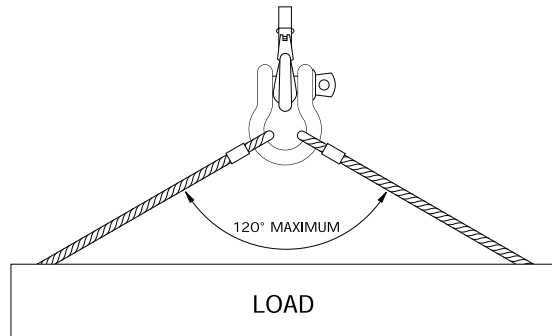
Side loads should be avoided as well, as the products are not designed for this purpose. If side loads cannot be avoided, the following reduction factors must be taken into account:

Load angle	Reduction for side loading New Working Load Limit
0°	100% of original Working Load Limit
45°	70% of original Working Load Limit
90°	50% of original Working Load Limit



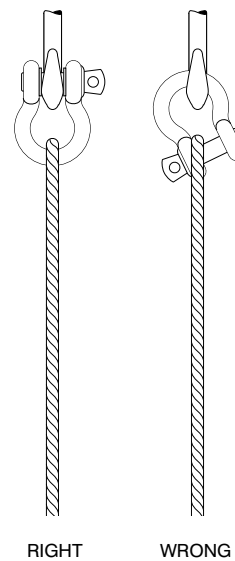
In-line loading is considered to be a load perpendicular to the pin and in the plane of the bow. Load angles in the table are the deviating angles from the in line loads.

When using shackles in connection with multi-leg slings, due consideration should be given to the effect of the angle between the legs of the sling. As the angle increases, so does the load in the sling leg and consequently in any shackle attached to that leg.



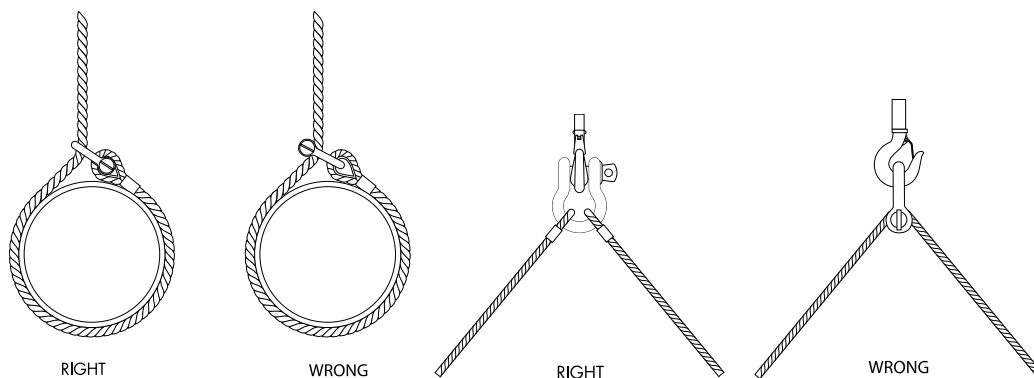
When a shackle is used to connect two slings to the hook of a lifting device, a bow type shackle must be assembled with the slings in the shackle body and the hook engaged with the shackle pin. The angle between the slings should not exceed 120°. If symmetrically loaded the shackle may be used to the full WLL.

To avoid eccentric loading of the shackle a loose spacer may be used on either end of the shackle pin. Do not reduce the width between the shackle jaws by welding washers or spacers to the inside faces of the eyes or by closing the jaws, as this will affect the properties of the shackle.



When a shackle is used to secure the top block of a set of wire rope blocks the load on this shackle is increased by the value of the hoisting effect.

Avoid applications where due to movement (e.g. of the load or the rope) the shackle pin can rotate and possibly be unscrewed. If such an application is necessary or when the shackle is to be left in place for a prolonged period or where maximum pin security is required, use a shackle with a safety bolt, nut and pin cotter pin.



Shackles should not be immersed in acidic solutions or exposed to acid fumes or other chemicals that are potentially harmful for the shackle. Please be aware that these types of chemicals are used in certain production processes.

Point loading

Most of the time the load bearing component that is in connection with a shackle is of a rounded shape. Point loading of shackles is allowed but the minimum diameter of a rounded component should be equal or bigger than the bow size of the shackle being used.

Bigger diameters and/or flat parts (at shackle pin side) to increase contact area can be beneficial. Sharp edges should be avoided.

Temperature

If extreme temperature situations are applicable, the following load reduction must be taken into account:

Temperature	Reduction for elevated temperatures New Working Load Limit
up to 200°C	100% of original Working Load Limit
200 - 300°C	90% of original Working Load Limit
300 - 400°C	75% of original Working Load Limit
> 400°C	not allowed

The rating of shackles to EN 13889 assumes the absence of exceptionally hazardous conditions. Exceptionally hazardous conditions include offshore activities, the lifting of persons and the lifting of potentially dangerous loads such as molten metals, corrosive materials or fissile materials. In such cases a competent person should assess the degree of hazard and the safe working load should be reduced accordingly from the Working Load Limit.

Inspection

It is required that the shackles are regularly inspected and that the inspection should take place in accordance with the safety standards given in the country of use. This is required because the products in use may be affected by wear, misuse, overloading etc. with a consequence of deformation and alteration of the material structure. Inspection should take place at least every six months and even more frequently when the shackles are used in severe operating conditions.

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