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User manual for Crosby 2130 & 2140 Anchor Shackles

Original Instructions

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Warnings

Manual Adherence
Strictly adhere to the manufacturer's manual for anchor shackles. Failure to use this shackle properly may result in serious injury or even death to you or others.

Wear Proper PPE
Always wear appropriate personal protective equipment when handling anchor shackles and engaging in lifting or rigging activities. This may include gloves, safety goggles, hard hats, and steel-toed boots to protect against potential hazards such as sharp edges, falling objects, and crushing injuries.

Altered or Damaged Products
Ratings shown in Crosby Group literature are applicable only to new or “as new” condition products. Please note that The Crosby Group Limited Warranty, and Product Instructions apply only to new and unaltered products. The Crosby Group neither recommends or approves any customer system designs or product alterations. Products of The Crosby Group that are altered in any way voids The Crosby Group Limited Warranty. Parties who alter products of The Crosby Group assume all responsibility for workmanship, design, application, warranty, and liability.

Avoid Pinch Points
Be cautious of pinch points when using anchor shackles, especially during installation or removal. Keep hands and fingers clear of moving parts to prevent pinching or crushing injuries.

Mind Your Back
Lift and move anchor shackles and associated loads using proper lifting techniques to avoid back strain and injury. Bend at the knees, keep your back straight, and lift with your legs to reduce the risk of back injuries.

Use Gear That Fits Together
Never force another shackle or other object into a shackle’s clevis or loading area. Wedging or loading ill-fitting shackles can lead to premature failure or damage of the devices.

Falling Objects
Secondary lifting points and bolt securement (nut, cotter, Easy-loc collar) should be securely attached prior to lift to avoid falling objects.

Loading
Do not load the shackle beyond its rated working load limit. Overloading can lead to loss of load, damage to shackle, and great bodily harm.

Training and Awareness
Ensure all personnel involved in using anchor shackles are adequately trained in proper safety procedures and are aware of potential hazards and risks associated with their use.
By adhering to these warnings and safety precautions, workers can minimize the risk of accidents and injuries when using anchor shackles in lifting and rigging operations.

All products manufactured by The Crosby Group, LLC, are sold with the express understanding that the purchaser is thoroughly familiar with the safe and proper use and application of product. Responsibility for the use and application of the products rests with the user.
These general instructions deal with the normal installation, operation, inspection, and maintenance situations encountered with the equipment described herein. The instructions should not be interpreted to anticipate every possible contingency or to anticipate the final system, crane, or configuration that uses this equipment.

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1. Introduction and EC declaration

This manual was developed to include the requirements of Directive 2006/42/EC on machinery section 1.7.4 Instructions and Annex II Declarations.

This manual pertains only to Crosby 2130 and 2140 bolt type anchor shackles. Information contained in this manual is in addition to the Warnings and Instructions section from the catalog. The latest version of this manual and the Warnings and Instructions may be downloaded from the www.kitocrosby.com website.

Read and understand all instructions, diagrams, and definitions in this manual before product use. The user is responsible for the application, use, and maintenance of the product. The user is responsible for consulting with a qualified rigging professional for the design and use of lifting systems when necessary.

Pay attention to safety information in bold print.
KEEP INSTRUCTIONS FOR FUTURE USE – DO NOT THROW AWAY!

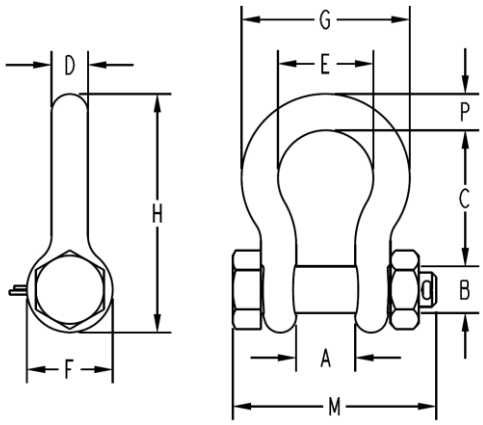
For further assistance, call:
In U.S.A. – Crosby Engineered Products Group at (800)777-1555.
In CANADA – Crosby Canada, Ltd. (877) 462-7672.
In EUROPE – N.V. Crosby Europe (+32)(0)15 75 71 25.

EC declaration of conformity and incorporation

Products marked with the "CE" logo are declared to be compliant with the applicable essential Health and Safety requirements of EU Machinery Directive 2006/42/EC.

2. General description

Crosby 2130 and 2140 Anchor Shackles are lifting devices consisting of a horseshoe shaped bow and a bolt. Bolt, nut, and cotter pin type shackles provide the most secure connection arrangement. They may be used for permanent, long term, or short-term installations.



Crosby 2130 and 2140 Anchor Shackles are designed, manufactured, and tested for use in a variety of lifting applications. Product verification includes testing for deformation, static tensile, and fatigue rating. All Crosby 2130 bolt type shackles 85t and above and Crosby 2140 30t and above are 100% proof tested to 2x WLL. Smaller size shackles are statistical proof tested in accordance with industry standards.

All Crosby 2130 and 2140 Anchor Shackles are marked with the following.

BOW:

- Manufacturer Identification
- Country of Origin
- CE mark
- WLL[1] in metric tons
- Material Traceability Code[2]
- Angle Indicator
- Size
- Quic-Check logo
- Grade

BOLT:

- Manufacturer Identification
- Grade
- Material Traceability Code
- WLL on 1-1/2" shackles and larger

Detailed technical data such as dimensions, working load limits (WLL) etc. are available in The Crosby Group Product Catalog at kitocrosby.com .

[1] The working load limit is the maximum load that can be applied to a lifting appliance or load device. The WLL for Crosby 2130 and 2140 shackles is valid when the shackle is loaded in a straight direction. See instructions for multi-leg and angular loading conditions.

[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.

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3. Intended use

General limitations for the use of Crosby 2130 and 2140 anchor shackles

- 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 subjected 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 vapors.

Use in exceptionally hazardous conditions

The load rating of lifting accessories assumes the absence of exceptionally hazardous conditions. Exceptionally hazardous conditions include dynamic loading, caustic environments, the lifting of personnel, and lifting of potentially dangerous loads such as molten metals, corrosive materials, or volatile substances. The degree of hazard should be assessed by a competent person and the working load limit adjusted accordingly.

Service Temperatures

The general service temperature is -40 °C to +200 °C. (-40°F to +400°F)

Cold Temperature Service

Crosby recommends the following practical guidelines for cold temperature operations below 0°F

- All lifting should be performed at a slow, steady rate. Shock loading should be avoided.
- All lifting equipment and fittings should be given a thorough visual inspection before each lift.
- If the equipment contains bearings, lubrication may be retarded, therefore an increased maintenance schedule may be necessary.
- All lifting equipment should undergo a periodic surface inspection using visual and/or NDT Techniques. This schedule and technique should be designed by qualified personnel employed by the user of the equipment taking into consideration the severity level of the service condition.
- Fittings with surface defects such as nicks, gouges, or cracks should not be used until these are removed by grinding (follow the contour of the part) within the allowable reduction of cross section. (5%)
- Fittings that have been welded or modified after leaving the factory should not be used for cold temperature application.

Angular Loading

The Crosby 2130 / 2140 Anchor Shackle is designed to carry the load at the center/bottom of the bow and evenly distributed on the shackle bolt to achieve full WLL and Ultimate Load. Angular Loading is possible but will cause a reduction in WLL capacity. For Angular Loading instructions, see “Angular Loading” Section under Section 5.

Fatigue

The mechanical properties of steel when a load is repeatedly applied is known as its fatigue strength. Fatigue failure can occur even if the shackle’s WLL has not been exceeded. Consider this when deciding inspection intervals.

Additional marking

If markings such as project code, serial number etc. are added, Crosby recommends the following: Use low stress stamps, such as round face full character, or dot faced stamps, of appropriate size in a low stress area. Indications no deeper than 1/32”. This will ensure the marking application does not reduce the shackle’s strength, corrosion resistance, or legibility of manufacturer’s markings.

4. Assembly

When assembling the 2130 / 2140 Anchor 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 nut 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 are properly secured with the safety cotter pin attached. A poor fitting between the shackle bow and

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bolt may be due to the bolt being bent, damaged threads or misalignment of the bolt holes. Under these circumstances the shackle must be removed from service.

5. User instructions

The 2130 / 2140 Anchor Shackle is only to be used after reading and understanding this manual.

Inspection prior to first use

Before first use ensure that:

- all markings on the body and the pin of the shackle are legible.
- the shackle bolt is the correct type.
- the body and bolt are not distorted or unduly worn.
- the body and bolt 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.

Inspection prior to each use

Before each use, the 2130 / 2140 Anchor Shackle must be inspected for damage or deterioration.

The inspection should be done in accordance with local regulations, but the guidance in Section 6 Inspection should as a minimum always be followed. 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 center of gravity.
- Check the conformity of the load with the WLL of the lifting equipment for the specific working configuration.
- Ensure that the 2130 / 2140 Anchor 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

- Angular Loading

The 2130 / 2140 Anchor 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 centerline to avoid undue bending stresses which will reduce the load capacity of the shackle.

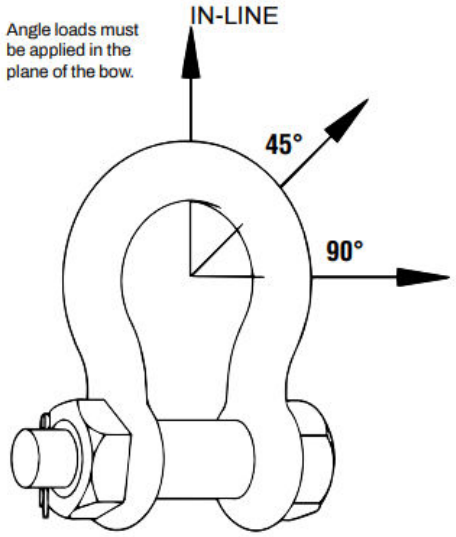
Angular should be avoided as the products are not designed for this purpose. If Angular Load cannot be avoided, the following reduction factors must be considered.
For 2130 / 2140 Anchor Shackles with a nominal size of 3”or smaller:

Angle of Side Load from Vertical In-Line of Shackle	Adjusted Working Load Limit
0° - 10° In-Line*	100% of Rated Working Load Limit
11°- 20° from In-Line*	85% of Rated Working Load Limit
21°- 30° from In-Line*	75% of Rated Working Load Limit
31°- 45° from In-Line*	70% of Rated Working Load Limit
46°- 55° from In-Line*	60% of Rated Working Load Limit
56°- 70° from In-Line*	55% of Rated Working Load Limit
71°- 90° from In-Line*	50% of Rated Working Load Limit

For 2130 / 2140 Anchor Shackles greater than 3” Nominal Size:

Angle of Side Load from Vertical In-Line of Shackle	Adjusted Working Load Limit
0 ° - 5° In-Line	100% Rated Working Load Limit
6° - 10° from In-Line	85% Rated Working Load Limit
>10° from In-Line	ANALYSIS REQUIRED

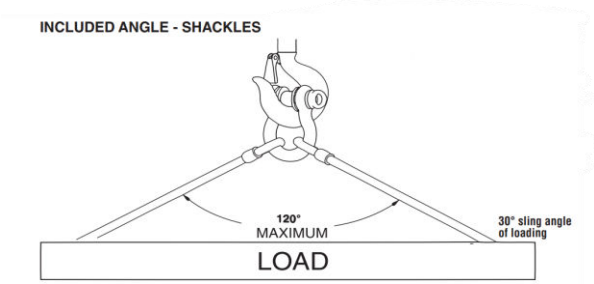
For shackles with WLL larger than 125 metric tons, where the angle of the side load is greater than 5 degrees, contact Crosby Engineering.



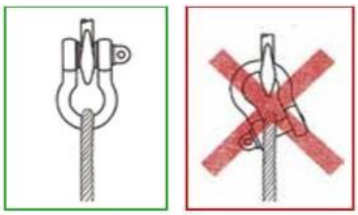
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- Included Sling Angles

  Shackles symmetrically loaded with two leg slings having a maximum included angle of 120° can be utilized to full Working Load Limit.
  For 2130 / 2140 Anchor Shackles with WLL less than 125 metric tons never exceed 120° included angle.
  For shackles larger than 125 metric tons, the maximum included angle is 90 degrees for full working load limit. Contact Crosby Engineering if included angle is greater than 90 degrees.



- Avoid non-uniform load distribution:
  It is recommended to distribute the load evenly across the total length of the shackle bolt with the center of gravity of the load directly below the centerline of the shackle. Best practice is to provide a pade eye width of 50%-80% or more of the shackle spread and center the load on the span of the pin. Washers/spacers may be used on both ends of the bolt so the load will not slide over to one side, and overload that ear. Shackles should not be forced together, nor should parts be welded onto the shackle to help center the load



- Avoid unstable loads

Swinging loads or swinging rigging equipment is a hazard. Loads and equipment should be always under control.



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

- Use of two connecting shackles:
  If two shackles are fitted together, it is generally recommended to connect the bows, provided there is adequate clearance to prevent binding or improper loading.

- 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. Shackle must be large enough to prevent pinching of synthetic slings.

- 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.

- Sling Efficiency:
  Wire ropes and soft slings require an efficiency be determined to derate the capacity of the sling based on the diameter of the shackle. A qualified person should determine this efficiency.

- Secondary Lifting Points
  Some 2130 / 2140 Anchor Shackles have eyebolts / handles affixed to the bolt. These attached lifting devices should only be used by adequately trained personnel to lift and position the bolt. Do not use to attach secondary loads to the shackle.

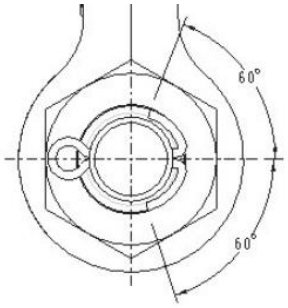
- Cotter Pins

  Extended prong cotter pins should be inserted into hole until the head is tangent to

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the bolt/pin, and oriented so the axis of the eye is parallel to the shank of the bolt/pin.

The prongs are to be bent in opposite directions around the bolt or pin as shown in the figure below.



The prongs may be bent with pliers or by gently tapping with a hammer.

*Note: Avoid bending the prongs over sharp radii which may promote breakage. If a prong breaks off or becomes damaged during installation, replace the cotter pin.

The ends of the prongs may be curled to form a small loop to reduce the potential for snagging or puncture wounds.

End of use/Disposal

The 2130 / 2140 Anchor Shackle bow and pin can be sorted/scrapped as general steel scrap.

6. Inspection/Maintenance

Inspection

Shackles must be regularly inspected and maintained to ensure the equipment is suitable for continued use.

Inspection, inspection frequency, and removal criteria shall be according to ASME B30.26-1.8.

The 2130 / 2140 Anchor Shackle should be withdrawn from service and referred to a competent person for thorough examination if any of the following are observed:

- The shackle 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, deposits which cannot be removed or distorted components or any other defects.

Records of examinations should be maintained.

Prior to the examination the 2130 / 2140 Anchor 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 qualified person.

Records of repairs should be maintained.

Any replacement component or part should be in accordance with the appropriate standard for that component or part. Use only genuine Crosby replacement parts.

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.

Training

Kito Crosby offers online and in person training for all products at:
https://www.thecrosbygroup.com/training/

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