

	AI TAKAMUL COMPANY FOR ENGINEERING TESTS AND PROFESSIONAL SAFETY LIMITED Lifting Inspection	Doc No: QC-LIF-P-004
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Title: Inspection Procedure of Shackles		Rev: 2
Established By: Ashraf Elsaid	Position: Lifting Supervisor	Date: JULY-2022
Approved By: Ahmed Mohamed	Position: Operation Manager	

Inspection Procedure of Shackles

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1. YOUR SAFETY IS FIRST:

Your safety wear is mandatory at job sites including in general: suit, shoes, helmet, gloves, ear plugs, glasses, and mask.

2. SCOPE:

This procedure covers the inspection and testing of shackles.

3. PRODUCT/ MANUFACTURE STANDARDS:

BS EN 13889: 2003 + A1: 2008	<i>Forged Steel Shackles for General Lifting Purposes – Dee Shackles and Bow Shackles – Grade 6 – Safety</i>
AS 2741-2002 AMDT 2	Shackles
ASME B30.20 - 2021	Below-the-Hook Lifting Devices
BS 3551:1962	Specification for alloy steel shackles
ISO 2415:2004	Forged shackles for general lifting purposes
RR-C-271, REVISION D	Chains and Attachments

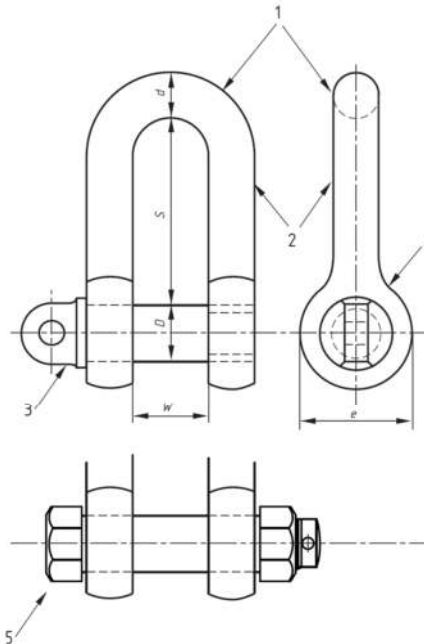
4. SHACKLES:

A shackle is a lifting accessory comprising a body and pin which are readily separable and can be used to connect a load to a lifting machine directly or in conjunction with other lifting accessories. Shackles types: Dee shackles and Bow shackles.

Dee shackle: a shackle the crown of which forms a semicircle of internal radius half the width, W, between the eyes.

The following figure shows a Dee shackle.

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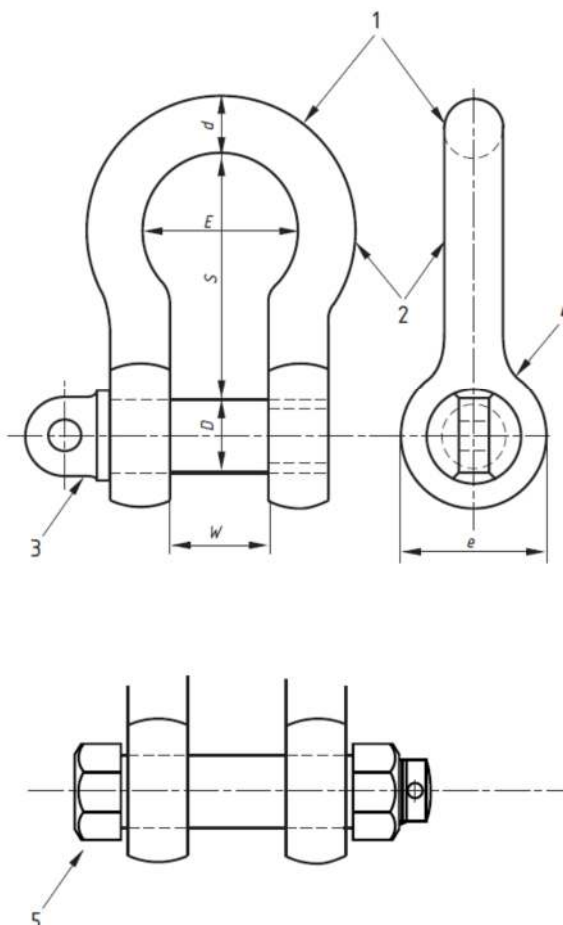


Key:

- 1 Crown
- 2 Body
- 3 Example of screwed pin with eye and collar – type W
- 4 Eye
- 5 Bolt type pin with hexagon head, hexagon nut and split cotter pin – type X

Bow shackle: a shackle the crown of which forms more than a semicircle of internal radius more than half the width, W , between the eyes

The following figure shows a Bow shackle:



Key:

1 Crown

2 Body

3 Example of screwed pin with eye and collar – type W

4 Eye

5 Bolt type pin with hexagon head, hexagon nut and split cotter pin – type X

5. INSPECTION AND TESTING OF SHACKLES:

5.1- INSPECTION AND TESTING OF NEW SHACKLES:

- Prior to use, all new Shackles shall be proof load tested by the sling manufacturer with written records kept of such testing.
- Client shall provide the manufacturer's test certificate at the time of inspection.
- If the record of test by the manufacturer is not available with the user, new shackles shall be load tested as per (7. PROOF LOAD TEST).

5.2- INSPECTION AND TESTING OF IN-SERVICE SHACKLES:

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- Shackles in use should be subject to periodic thorough examination by a competent person. The period between such examinations will depend upon the amount of use but should not exceed **six months**.
- In-service shackles shall be visually inspected as per (6. INSPECTION PROCEDURE AND REMOVAL CRITERIA).
- If the record of test by the manufacturer / inspection body is not available with the user or the shackle is repaired as per the manufacturer's recommendations, shackles shall be load tested as (7. PROOF LOAD TEST).

Note: If found necessary by the competent person, the new and in-service shackles(s) shall at least be subjected to Magnetic Particles Inspection (MPI), Liquid Penetrants Testing (PT). These tests shall be performed on shackle pin and body. MPI shall be performed in accordance with procedure ATS-NDT-P-001, PT shall be performed in accordance with procedure ATS-NDT-P-002. Acceptance criteria of NDT are as per BS EN 13889 *para* 6.3.2. *Non-Destructive test*

6. INSPECTION PROCEDURE AND REMOVAL CRITERIA:

6.1- PRE-USE INSPECTION BY USER:

In addition to the thorough examination all shackles shall be visually inspected by a responsible person prior to use or on regular basis, taking account on the conditions of services. This inspection shall be carried out with shackle in a reasonably clean condition and in adequate lighting. If any of the following points are not accepted, the shackles should be withdrawn from service and referred to a competent person:

- a) the body and the pin of shackle are both identifiable as being of the same size, type and make;
- b) all markings are readable;
- c) the threads of the pin and the body are undamaged;
- d) the body and pin are not distorted;
- e) the body and pin are not unduly worn;
- f) the body and pin are free from nicks, gouges, cracks and corrosion.

6.2- IN-SERVICE INSPECTION:

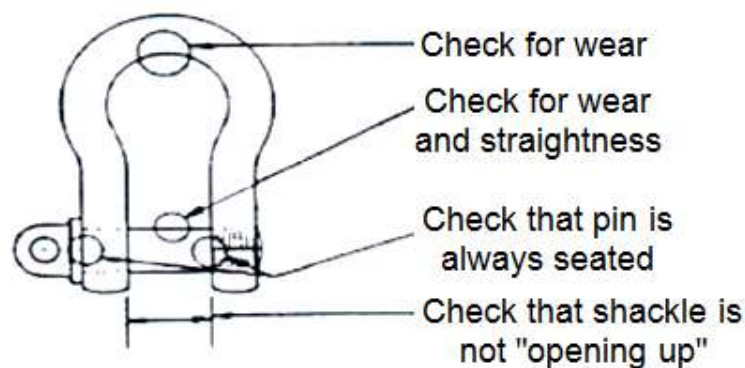
In-service inspection shall be carried out by the competent / qualified person, this person shall inspect the shackles for the following damages and if any damage is found, the shackle should be withdrawn from service:

- Missing or illegible marking:
 - Shackle Body Identification: Name or trademark of manufacturer, traceability code, WLL, size.
 - Shackle Pin Identification: Name or trademark of manufacturer, grade material, traceability code
- Indications of heat damage including weld spatter or arc strike.
- Excessive pitting or corrosion.

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- Excessive nicks or gouges.
- Excessive thread damage.
- Bent, twisted, distorted, stretched, elongated, cracked, or broken load bearing components.
- A (8%) reduction of the original or catalogue dimension at any point around the body or pin.
- Incomplete pin engagement.
- Evidence of unauthorized welding.
- Other conditions: including visible damage that cause doubt as to the continued use of the shackle.

The following figure shows the areas to be inspected in shackles.



7. PROOF LOAD TEST:

Prior to use, all new shackles shall be proof load tested by the sling manufacturer with written records kept of such testing. Client shall provide the manufacturer's test certificate at the time of inspection. If the record of test by the manufacturer / inspection body is not available with the user or the shackle is repaired as per the manufacturer's recommendations, only then the shackles shall be load tested as per the following procedure prior to initial use and the user shall maintain record:

- All shackles shall be proof load tested to $(2 \times WLL)$.
- If proof load tested, a shackle shall be inspected after the test for the following conditions:
 - Cracking
 - Deformation
 - Paint flaking
 - Loosening of pins

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8. MARKING:

- **Shackles:**

Each shackle shall be legibly and indelibly marked in a manner which will not impair the mechanical properties of the shackle. This marking shall include at least the following information placed on the shackle by the manufacturer:

- a) working load limit in tonnes
- b) the grade number.
- c) the manufacturer's name, symbol or code;
- d) traceability code.

- **Shackle pins:**

All shackle pins, 13 mm diameter and above, shall be legibly and indelibly marked with the relevant grade number traceability code and manufacturer's symbol in a manner which will not impair the mechanical properties of the pin.

Pins below 13 mm diameter shall be marked with at least either the grade number or the traceability code.

If the item is not already marked, it shall be clearly stamped or marked with an identification number and if the test is satisfactory, the WLL and date of the test.

9. REPORTING AND CERTIFICATION:

A certificate of test and thorough examination will be issued upon the satisfactory completion of the examination, i.e. the lifting equipment is safe to operate

A defect report will be issued if the lifting equipment fails to meet the requirements.

10. Inspector Competency and Qualification:

Inspector shall have minimum qualification of LEEA Foundation – LEEA Lifting Equipment General