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Load Restraint Assemblies on Road Vehicles – General Requirements for Tensioning Devices

道路车辆装载物固定装置 拉紧装置通用要求

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Table of Contents

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1 Scope

This Document specifies the classification, technical requirements, test methods, inspection rules, and marking, packaging, transportation and storage requirements for tensioning devices in load restraint assemblies on road vehicles.

This Document is applicable to the tensioning devices specified in the load restraint assemblies on road vehicles with a hand operation force no greater than 500N.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 6461-2002 Methods for Corrosion Testing of Metallic and other Inorganic Coatings on Metallic Substrates - Rating of Test Specimens and Manufactured Articles Subjected to Corrosion Tests

GB/T 10125 Corrosion Tests in Artificial Atmospheres - Salt Spray Tests

GB/T 23914.2-2009 Load Restraint Assemblies on Road Vehicles – Safety - Part 2: Web Lashing Assembly Made from Synthetic Fibers

CB/T 3818-2013 Turnbuckle for Rigging

JB/T 7335-2016 Lever Hoists

JB/T 12983-2016 Wire Rope Lever Hoists

3 Terms and Definitions

For the purposes of this Document, the following terms and definitions apply.

3.1 Tensioning devices

In load restraint assemblies, mechanical devices for generating and maintaining tension force.

[SOURCE: GB/T 23914.2-2009, 3.3, modified]

3.2 Ratchet tensioner

The device that drives ratchet by the operating handle to generate and maintain tension force on the flat ribbon wound on the grooved shaft.

3.3 Lashing winch

The device that drives the grooved shaft by operating the crowbar to generate and maintain tension force on the flat ribbon (or wire rope) wound on the grooved shaft.

3.4 Overcentre buckle

The device that generates and maintains tension force on the flat ribbon by means of an eccentric rod.

3.5 Lashing capacity; *LC*

The maximum permissible tension force that the lashing device is designed to withstand.

3.6 Standard tension force

The force acting on the lashing device after the handle of the tensioner is released.

4 Classification

4.1 Tensioning devices are divided into the following three categories according to the different matching tensioning elements:

--- tensioning device with synthetic fiber lashing belt;

--- chain tensioning device;

--- Wire rope tensioning device.

4.2 The tensioning device with synthetic fiber lashing belt is divided into the following three categories according to their structure:

--- Ratchet tensioner, the structure is shown in Figure 1a);

--- Overcentre buckle, the structure is shown in Figure 1b);

--- Lashing winch with synthetic fiber lashing belt, the structure is shown in Figure 1c).

times *LC*;

b) Chain tensioning device: for a short link chain with a diameter of 6mm~10mm, the standard tension force is no less than 0.25 times *LC*; for a short link chain with a diameter of 13mm~16mm, the standard tension force is no less than 0.15 times *LC*;

c) Wire rope tensioning device: the standard tension is no less than 0.25 times *LC*.

5.6 Strength properties

5.6.1 Verification force

5.6.1.1 The load-bearing parts of tensioning device with synthetic fiber lashing belt, ratchet tensioner, steel wire rope lashing winch, and wire rope tensioner shall be able to bear 1.25 times *LC*, unload after 1 min of constant load, then shall not appear the deformation and other defects that may affect their performance.

5.6.1.2 The strength requirements and test methods of the turn buckle tensioner shall comply with the provisions of 4.6.1 and 5.6.2 in CB/T 3818-2013.

5.6.1.3 The dynamic load performance of the chain lever hoist shall comply with the provisions of 4.2.3 in JB/T 7335-2016.

5.6.1.4 The dynamic load performance of the wire rope lever hoist shall comply with the provisions of 4.6 in JB/T 12983-2016.

5.6.1.5 The *LC* of the chain lever hoist and the wire rope lever hoist is equivalent to the force required to withstand the rated lifting capacity; and its value is the product of the rated lifting capacity and conversion factor of the force (the value takes 9.8).

NOTE: The *LC* of the turn buckle tensioning device is the safe working load specified in CB/T 3818-2013.

5.6.2 Breaking force

5.6.2.1 The breaking force of tensioning device with synthetic fiber lashing belt, ratchet tensioner, wire rope lashing winch and wire rope tensioner shall be no less than twice *LC*.

5.6.2.2 The breaking force of the turn buckle tensioner shall comply with the provisions of 4.6.2 in CB/T 3818-2013.

5.6.2.3 The breaking force of the chain lever hoist shall comply with the provisions of 4.2.7 of JB/T 7335-2016.

5.6.2.4 The breaking force of the wire rope lever hoist shall comply with the provisions of 4.8 of JB/T 12983-2016.

6 Test Methods

6.1 Appearance

Visual inspection and hand-feeling inspection are adopted.

6.2 Corrosion resistance

Test shall be carried out according to the neutral salt spray test method specified in GB/T 10125 and the test period is 96h.

6.3 Operation flexibility

Operate each rotating part to see if there is any clamping stagnation phenomenon.

6.4 Unloading performance

Apply a force of 0.3 times *LC* to the tensioning device; and then operate the handle to release the tension force. After the tension force is released, record the following characteristics of the tensioning device:

--- The ability to release the tension force by operating the handle without using any auxiliary tool (extension rod);

--- Evaluate any hazards (such as hand injuries or scratches) caused to the operator during release.

6.5 Standard tension force

6.5.1 The standard tensile test of the tensioning device with synthetic fiber lashing belt shall be carried out in accordance with the provisions of 6.5.1 in GB/T 23914.2-2009.

6.5.2 The standard tensile test of the chain tensioning device shall be carried out in accordance with the following provisions:

a) Put the tensioning device into the tensile testing machine, so that the fittings at both ends are connected with the clamps of the tensile testing machine in a straight state;

b) Manually operate the handle of the tensioning device with a force no greater than 500N, and record the lashing capacity generated by the tensioning device;

c) Determine whether the lashing capacity meets the requirements of 5.5b).

6.5.3 The standard tensile test of the wire rope tensioning device shall be carried out in accordance with the following provisions:

a) Put the tensioning device into the tensile testing machine, so that the parts at the two ends

Appendix A

(Normative)

Use and Maintenance

A.1 Use

A.1.1 The operating force of the handle or crowbar shall not exceed 500N.

A.1.2 The ratchet tensioner shall not be operated by a foot handle.

A.1.3 When using a ratchet tensioner, the applied force shall be continuous and uniform; and the hand operating force may be released after the stop jack falls into the ratchet tooth groove.

A.1.4 The diameter of the crowbar head used for lashing winch shall be between 0.02m and 0.03m; and the length shall be between 0.3m and 1.2m. The length and diameter shall match. Too long crowbars shall deform the lashing winch.

A.1.5 When the crowbar is used by the lashing winch to release the force, the crowbar shall be prevented from accidentally disengaging. If the pawl does not fall into the ratchet tooth groove, a recoil force shall be generated, which shall cause injury to the operator.

A.1.6 The pawl of lashing winch shall be able to mesh with the ratchet under its own gravity, otherwise it shall be adjusted in time.

A.2 Maintenance

A.2.1 After welded to the vehicle floor beams, the lashing winch shall be painted again, and the thickness of the coating shall be controlled. Excessive painting shall cause the pawl to fail to mesh with the ratchets under its own gravity.

A.2.2 The tensioning device shall be checked regularly and replaced in time if there is deformation, corrosion or damage.

A.2.3 Lubricating oil shall be regularly added to the following positions of the tensioning device:

a) The surface where the ratchet of the ratchet tensioner contacts the stop gallows and the lashing winch;

b) Pawl shaft of the lashing winch;

c) The rivet position between stop gallows of the overcentre buckle and the lashing winch.

A.3 Warnings

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