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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Freight container spreaders

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1 Scope

China's national standard for freight container spreaders, and the current edition of GB/T 3220, replacing the 1982 edition. It specifies the classification, the model designation, the dimensions, the technical requirements, the test methods, the inspection rules, and the marking and transport of these devices, and it applies to fixed and telescopic single container spreaders, with other types able to use it as a reference. A spreader is the tool that hangs from a container crane and takes hold of the box. It engages the four corner castings of the container with twistlocks, lifts up to thirty tonnes, and does so once every ninety seconds or so through a working shift, over an operating life measured in millions of cycles. A telescopic spreader also changes its length between the twenty foot, forty foot and forty-five foot container sizes without the crane stopping. Two things make its design unforgiving. The first is that the container is standardised and the spreader is not free to depart from it: the corner castings, their spacing and the twistlock geometry are all fixed by the container standards, so the spreader has to work within dimensions it did not choose. The second is that a container carried over a quay, a ship or a stack is carried over people,

and a spreader that releases its load is a fatal accident rather than a breakdown - which is why the standard leans on the crane design rules of GB/T 3811, the lifting appliance safety rules of GB/T 6067 and a substantial body of welding and non-destructive testing requirements. Issued on 2 September 2011 and in force since 1 March 2012.

This Standard specifies the classification, model, dimension, technical requirements, test methods, inspection rules, marking and transportation of the freight container spreader. This Standard is applicable to fixed and telescopic single freight container spreaders. Other types of freight container spreaders (hereinafter referred to as spreader) can be used as a reference.

2 Normative References

The following documents are essential to the application of 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) are applicable to this document.

GB/T 985.1 Recommended Joint Preparation for Gas Welding, Manual Metal Arc

GB/T 985.2 Recommended Joint Preparation for Submerged Arc Welding

GB/T 1228 High Strength Bolts with Large Hexagon Head for Steel Structures

GB/T 1229 High Strength Large Hexagon Nuts for Steel Structures

GB/T 1230 High Strength Plain Washers for Steel Structures GB/T 1413 Series

3 Terms and Definitions

For the purpose of this document, the following terms and definitions apply.

3.1 Freight container spreader A lifting tool connecting with the above and the below by a hoisting machine and a lifting device. The lifting tool has a structure suitable for a freight container box body, and is connected with a corner piece of the box body through a twist lock at a corner portion to perform operations of the freight container lifting.

4 Classification, Model and Dimension

4.1 Classification The basic types of freight container spreaders are as follows:

- a) Fixed container spreader: no special telescopic power unit, the geometric size of the freight container spreader remains unchanged;
- b) Telescopic freight container spreader: equipped with a mechanical or hydraulic telescopic mechanism, which can perform telescopic adjustment within the relevant range of 6.10m (20ft) and greater than 6.10m (20ft).

5.2 Materials

5.2.1 The material of main parts (twist lock, ejector rod) shall have the certificate of conformity from the material manufacturer.

5.2.2 The yield limit of the material selected for the load-bearing structural members of the freight container spreader shall be no lower than 235 MPa specified in GB/T 1591. The steel should be de-rusted before use.

5.2.3 The twist lock shall be made of high-quality steel with a yield limit of no less than 450 MPa.

5.3 Structural parts

5.3.1 The cutting surface that affects the appearance quality and product performance shall be no lower than the Level-2 specified in CB/T 3123.

5.3.2 Welding rods, wires and fluxes shall comply with the provisions of GB/T 5117, GB/T 5118; and shall be matched with the material of the structural parts to be welded.

5.3.3 The shape of the weld bevel shall comply with the provisions of GB/T 985.1 and GB/T 985.2.

5.3.4 The quality of the butt welds of the stressed structural parts is no lower than the Level-I specified in GB/T 11345 and the Level-II specified in GB/T 3323.

5.3.5 The shape and dimensions of the welded joints and welds of the components shall comply with the provisions of GB/T 985.1 and JB/T 7949. All welds shall be free of missing welds, burn-throughs, cracks, unwelded penetrations, undercuts, slags, and the like defects that affect performance and appearance quality.

5.3.6 After welding, the bending and arching of the frame shall not exceed 1.5 per mille of the center distance of the spreader in the length and width directions.

5.3.7 High-strength bolts, nuts, and washers used to connect metal structural parts shall meet the requirements of GB/T 1228 ~ 1230.

5.3.8 The telescopic boom or beam of the telescopic spreader body shall be provided with lifting ears for loading and unloading bulk cargo.

5.4.1 Twist lock device

5.4.1.1 Twist lock device can be divided into manual, semi-automatic and power twist locks.

5.4.3.1 The telescopic device of the spreader is mainly composed of a telescopic beam, a power device and a transmission device.

5.4.3.2 The telescopic performance of the spreader shall be smooth and free of obstruction.

5.4.3.3 The sliding surface between the telescopic beam and the fixed beam shall be equipped with abrasion reducing linings or rollers.

5.4.3.4 The coefficient of additional frictional resistance of the telescope should be 1.2~1.5.

5.4.3.5 Under the action of rated load, the deflection value, Y_L , of the telescopic beam is no greater than $L_c/700$ (L_c is the effective working length of the cantilever).

5.4.3.6 The chain for the telescopic device shall meet the design requirements and provisions of GB/T 3811.

5.4.3.7 Each chain shall be interchangeable, and an adjustable device shall be installed at the joint between the telescopic chain and the structure.

5.4.3.8 The safety factor of the chain shall be no lower than the safety factor of the lifting chain specified in GB/T 6067.

5.4.4 Hydraulic system

5.4.4.1 The hydraulic system shall conform to the provisions of GB/T 3766. Before assembly of the hydraulic system, the joints, pipelines and channels shall be cleaned without any dirt; after assembly, the system shall be cleaned and the cleaning oil shall be drained completely.

5.4.4.2 The main hydraulic components shall be accompanied by the certificate of conformity of the manufacturer.

5.4.4.3 The pipelines of the hydraulic system shall be shock-resistant, impact-resistant and leak-free.

5.4.4.4 The hydraulic system installed on the spreader shall adopt vibration reduction measures.

5.4.4.5 The filter element and hydraulic oil shall be inspected every 1000h of the hydraulic system operation interval, and those that are not qualified shall be replaced.

5.4.4.6 The installation of hydraulic oil pumps and motors shall be easy to install, inspect and replace.

5.4.5 Electrical system

5.6.3 An eye-catching safety sign shall be painted on the end of the telescopic beam, and the color of the safety sign shall comply with the provisions of GB 2893 and GB 2894.

5.7 Appearance quality and dimensions

5.7.1 The surface of all parts shall be flat, without obvious deformation and damage, and the welds shall be uniform and beautiful.