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

GB 12142-2007

safety requirements for portable metal ladders

便携式金属梯安全要求

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Foreword

The provisions of all chapters, except chapters 1, 2 and 3, shall be compulsory in this Standard. This Standard is the combination of revision to GB 12142-1989 "Safety Standard for Light-metal Extension Ladders" and GB 7059.3-1986 "Safety Standard for Light Metals Portable Stepladder". This Standard replaces GB 12142-1989 "Safety Standard for Light-metal Extension Ladders" and GB 7059.3-1986 "Safety Standard for Light Metals Portable Stepladder". Compared with GB 12142-1989 "Safety Standard for Light-metal Extension Ladders" and GB 7059.3-1986 "Safety Standard for Light Metals Portable Stepladder", this Standard has the major technical differences as follows: -Extend the application scope of the Standard, cover the safety requirements for two-section extension ladder, stepladder, as well as three-section extension ladder, single ladder and combination ladder; -Add the normal load grading for ladders and the structure performance requirements corresponding to normal load; -Add metal fitting load test requirements, rung torsion test requirements, stile cantilever bending test requirements and stile cantilever drop test requirements for extension ladder and single ladder; -Add the following test requirements for stepladder. stile bending test requirement, step (or rung) and stile shear strength test requirements, torsional stability test requirements, transverse pull test requirements, front and back stile cantilever bending test requirements, front and back stile cantilever drop test requirements and stile torsion and spreader test requirements; -Cancel the horizontal bending test requirement for stepladder; -Make full revision to other contents

on structural requirement, operating requirement and test requirement. This Standard is proposed by the State Administration of Work Safety. This Standard is under the jurisdiction of the National Technical Committee 288 on Safety Production of Standardization Administration of China (SAC/TC 288). Drafting organizations. Jilin Academy of Safety Science and Technology, ChangChun University of Technology and Suzhou Baofu Light Industry Product Co., Ltd. Chief drafting staffs. Xiao Jianmin, Zheng Fanying, Qu Sheng, Han Lianying and Lu Xiongying All previously replaced editions hereof are as. -GB 12142-1989; -GB 7059.3-1986. NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA Safety Requirements for Portable Metal Ladders

1 Scope

China's mandatory national safety standard for portable metal ladders. Falls from ladders are among the most common serious injuries in construction and maintenance anywhere, and the causes are a short and repetitive list: the ladder slips at the foot, it is overloaded, a rung or a stile fails, or a stepladder's spreader gives way and it folds. The standard addresses each. It sets the duty ratings and the load tests the ladder must survive, the strength of the rungs and their attachment to the stiles, the slip resistance of the feet, the stability and the locking of stepladders and extension mechanisms, and the marking that tells the user which duty rating they are standing on. Aluminium's conductivity brings the other hazard: a metal ladder near an overhead line is a fatal combination, and the required warnings exist because that accident keeps happening.

This Standard specifies design/manufacturing safety requirements, test requirements, safe operation requirements and others for portable metal ladders. This Standard is applicable to portable metal extension ladder (two-section or three-section extension ladders), portable metal single ladder, portable metal stepladder and portable metal combination ladder used on production activities.

2 Normative References

The provisions of following documents, through reference of this Standard, constitute provisions of this Standard. For those documents which are dated, neither their subsequent amendment (excluding correction) nor their revision applies to this Standard. However, the parties who enter into agreement according to these specifications are encouraged to research whether the latest edition of the document is applicable. For those documents which are undated, the latest edition of the normative document is applicable.

GB/T 17889.1 Ladder - Part 1. Terms, Types and Function Dimensions

3 Terms and Definitions

For the purposes of this Standard, the following terms and definitions and the ones given in

GB/T 17889.1 apply.

3.1 Portable metal extension ladder Portable leaning ladder formed by two or three sections, whose length is adjustable and primary components (stile and step/rung) are made by metallic material

3.2 Portable metal single ladder (straight ladder) Portable leaning ladder formed by only a section, whose length is non-adjustable and primary components (stile and step/rung) are made by metallic material

3.3 Portable metal stepladder Working length The length measured (along the stile) from the ladder bottom supporting point to the top supporting point when the ladder is in the predetermined operation state

3.15 Maximum working length (maximum extension length) The working length of an extension ladder when its extensible sections are extended to the maximum place (keeping the required minimal lap)

3.16 Highest standing level The vertical distance from the supporting plane (ladder bottom) to the highest step (or rung) that the user is allowable to ascend to in the predetermined state

3.17 Inside clear width The distance measured (parallel to the step / rung) between flanges on two stile of a ladder

3.18 Normal load The maximum load (including weights of ascender, and carried materials and tools) that a ladder can bear in the predetermined operation condition

3.19 Test failure Visible failure to ladder structure or component(s) due to test(s), including corrugation, distortion, shearing, tearing or breakdown

3.20 Ultimate failure Severe failure to ladder structure or component(s) due to test, which causes that the ladder structure or component(s) due cannot work properly

3.21 Visible damage Failure that can be distinguished and identified clearly by visual check

4 General

4.1 Normal Load Portable metal ladders shall be able to bear a normal load not less than 90kg and identified by the normal load. By load bearing capacity, normal loads of ladders may be classified as four classes. 90kg, 100kg, 110kg and 135kg.

4.2 Corrosion Resistance Ladders shall be made of corrosion-resistant material as much as possible; otherwise, they shall be applied with anti-corrosion treatment.

4.3 Exposed Metal Surface Exposed metal surface of a ladder shall be free of sharp edge, burr and other structural defect. rung shall be larger than 20mm.

6.4 Stepladder Inclination Angle

6.4.1 When a stepladder (front ladder section) separates to the working position, the inclination angle of the front section shall not be larger than 73° and the one of the back section shall not be larger than 80° .

6.4.2 When trestle ladder or accommodation ladder separates to the working position, the inclination angle of the stile shall not be larger than 77° .

6.5 Step (or Rung) Connection When the stepladder is in working position, the steps (or rung) shall be kept horizontal and parallel with each other (allowable tolerance $\leq 3\text{mm}$). When step (or rung) and stile are connected by fasteners, at least one fastener shall penetrate out of the front of each side stile, and at least one fastener shall penetrate out of the back of each side stile. Step (or rung) on bottom side shall be used with bracing reinforcer or equivalent reinforcing piece.

6.6 Ladder Tip At least fasteners penetrate through each side of front stile so that the ladder tip is fixed up. The mode of fastening the back ladder foot to the tip shall enable the hinge rotate flexibly.

6.7 Gantry The fixing of a gantry as a part of stepladder shall enable gantry to fold upward when the stepladder is folded up. When the ladder is 2.4m or shorter, the gantry structure shall enable it to be folded up before the ladder is folded, or to be folded with the ladder simultaneously; the gantry shall extend to the stile facing towards the user when ladder folding.