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

**GB/T 32057-2015**

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**Test method for the hardness and scratch resistance of the  
glass of high speed multiple units**

高速动车组玻璃硬度和抗划伤试验方法

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Quarantine;  
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### Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules. The standard proposed by China Building Materials Federation. The industry standard by the National Standardization Technical Committee special glass and glass (SAC/TC447) centralized. This standard is drafted by: China Building Materials Certification & Inspection Group Co., Ltd. Participated in the drafting of this standard. Anchor Glass Co., Ltd., Jiangsu, Fuyao Glass Industry Group Co., Ltd., Beijing Ming Shield Technology Surgery Ltd, Anping Jinlong Vehicle Equipment Co., Ltd., CSR Qingdao Sifang Locomotive Co., Ltd., Changchun Railway Vehicles Shares Limited. The main drafters of this standard. Pang Shi-hong, Wang Chuang Shou-Jiang Jin, pool chief, Wang Lin, Ma Tao, Zhangfang Tao, Liu Zhongmei, Zhao Wei, Hu Yue, Zang Shuguang, Wang Wei. EMU and scratch-resistant glass hardness test methods for High Speed

### 1 Scope

China's national test method for the hardness and the scratch resistance of the glazing fitted to high speed trains - the windscreen and side windows of a set running at 300 km/h, which are struck by grit, by ballast and by insects at a velocity where a scratch is not cosmetic damage but the start of a fracture, and where a windscreen that has gone hazy has to be changed. It specifies the terms and definitions, the test methods for the hardness and for the scratch resistance, the test equipment, the test requirements, the test procedure and the test report. It applies to the hardness and scratch resistance testing of the glass of high speed multiple units with a design speed of not less than 200 km/h; the glass of other types of vehicle may be tested by reference to it. Two different properties are measured. The hardness is determined by indentation, with the testing machine verified and calibrated in accordance with GB/T 4340.2, and answers how far the surface resists being deformed at all. The scratch resistance is determined by drawing a defined indenter across the surface under a defined load and at a defined speed, and answers what happens once the surface has been attacked - whether the glass takes a fine mark or a deep groove, and at what load the damage becomes visible. The clauses on the equipment and the test requirements set what makes the two determinations comparable between laboratories: the

geometry and the condition of the indenter, the load and how it is applied, the speed and the length of the traverse, the surface of the specimen and how it is conditioned and cleaned, and how the resulting mark is examined and rated. Issued on 13 October 2015 and in force since 1 September 2016, it is held by SAC/TC 447.

This standard specifies the terms and definitions EMU glass hardness and scratch resistance test methods, test equipment, test requirements, test Test procedures, test reports. This standard applies to the design speed of not less than 200km/h high-speed EMU glass hardness and scratch resistance test, other types of glass Glass hardness and scratch resistance test can refer to use.

## 2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

GB/T 4340.2 metallic materials - Vickers hardness test - Part 2. Verification and calibration of hardness ( GB/T 4340.2-2012, ISO 6507-2:2005, MOD)

## 3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Critical load criticalload Scribing process, the sample surface is scratched applied normal load.

3.2 Glass scratch resistance scratchresistance Glass resistance scored a hard object, the value of critical load occurs when scratched with a glass of representation.

## 4 Test Instruments

4.1 hardness Hardness should be consistent with the provisions of GB/T 4340.2, and can be applied 4.903N (0.5kgf) force.

4.2 Scratch Tester Scratch instrument should contain the following sections.

- Load loading apparatus load range 0N ~ 100N, precision 0.1N;
- Acoustic emission means for detecting a sound signal when the glass is scratched;
- Sample stage, should be able to adjust the height;
- Rockwell diamond indenter (conical tip radius of 0.2mm, cone angle of 120 °);
- Indenter (or sample units) should at least be able to move along a horizontal direction, moving speed of 1mm/min ~ 10mm/min.