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**RAILWAY INDUSTRY STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**TB/T 2328.5-2008**

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**Test Method for Railway Ballast - Part 5: Crushing Rate Test for  
Ballast Aggregate  
(English Translation)**

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### Foreword

This Standard non-equivalently adopts EN 13597-2003 "Railway applications - Rubber suspension components - Rubber diaphragms for pneumatic suspension springs".

Compared with EN 13597-2003, the main differences are as follows.

- ADD requirements and methods for rigidity, height, creep, high and low temperature tests of auxiliary spring;
- ADD vertical fatigue test requirements and methods of air spring for swing hanger bogie;
- ADD horizontal fatigue test requirements and methods of air spring for bolster bogie;
- ADD vertical damping coefficient test methods of air spring with orifice;
- AMEND preparation method of test samples for environment endurance test of air spring;

- ADD requirements and methods of low temperature air tightness.

This Standard replaces TB/T 2841-2005 "Air spring for railway vehicle". Compared with TB/T 2841-2005, the main changes are as follows.

- ADD requirements and methods for rigidity, height, creep, high and low temperature tests of auxiliary spring;
- ADD property parameters requirements of the ultimate pressure withstand capability of air spring, the maximum physical dimensions, load capacity at different height; AMEND test methods of main property parameters;
- AMEND items and methods of environment endurance test of air spring.

Annex A of this Standard is informative while Annexes B and C are normative.

This Standard was proposed and shall be under jurisdiction of Qingdao Sifang Rolling Stock Research Institute Co., Ltd.

Main drafting organizations of this Standard. Qingdao Sifang Rolling Stock Research Institute Co., Ltd., Zhuzhou Times Material Technology Co., Ltd. AND Locomotive and Car Research Institute of China Academy of Railway Sciences.

Main drafters of this Standard. Cheng Haitao, Wang Fusheng, Fang Kejuan, Du Shang, Wang Liming, Wang Jin, Chen Canhui and Yuan Liangming.

The previous editions replaced by this Standard are as follows.

- TB/T 2841-1997;
- TB/T 2481-2005.

Air spring for railway vehicle

## 1 Scope

This Standard specifies the terms, symbols and coordinate system definition, product property requirements, inspection test method, inspection rules, marking, packaging, storage and transportation of air spring for railway vehicle.

This Standard does not describe those components that may influence air spring properties, such as air supply system of air duct, control valve or auxiliary chamber.

This Standard is applicable to newly-made air spring for railway passenger vehicles

and CRH (China Railway High-speed) vehicles. Air spring for metro vehicles, urban rail vehicles, mono-rail vehicles, magnetic suspension vehicles and other kinds of rail vehicles can use this Standard as reference.

## 2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 528-2009 Rubber, vulcanized or thermoplastic - Determination of tensile stress-strain properties (ISO 37.2005, IDT)

GB/T 531.1-2008 Rubber vulcanized or thermoplastic - Determination of indentation hardness - Part 1. Durometer method (Shore hardness) (ISO 7619-1.2004, IDT)

GB/T 532-2008 Rubber vulcanized or thermoplastic - Determination of adhesion to textile fabric (eqv ISO 36.2005)

GB/T 533-2008 Rubber vulcanized or thermoplastic - Determination of density (ISO 2781.2007, IDT)

GB/T 1682-1994 Rubber, vulcanized - Determination of low-temperature brittleness (single test piece method) (eqv ISO 812.1991)

GB/T 1690-2006 Rubber vulcanized or thermoplastic - Determination of the effect of liquids (ISO 1817.2005, MOD)

GB/T 2941-2006 Rubber - General procedures for preparing and conditioning test pieces for physical test methods (ISO 23529.2004, IDT)

GB/T 3512-2001 Rubber, vulcanized or thermoplastic - Accelerated ageing and heat resistance tests - Air-oven method (eqv ISO 188.1998)

GB/T 7759-1996 Rubber, Vulcanized or thermoplastic - Determination of compression set at ambient elevated or low temperatures (eqv ISO 815.1991)

GB/T 9867-2008 Rubber vulcanized or thermoplastic - Determination of abrasion resistance using a rotating cylindrical drum device (ISO 4649.2002, IDT)

GB/T 11211-2009 Rubber vulcanized or thermoplastic - Determination of adhesion to metal - Two-plate method (ISO 814.2007, IDT)

GB/T 13642-1992 Rubber, vulcanized - Resistance to ozone ageing - Dynamic strain test method (neq ISO 1431 -2.1982)

GB/T 13934-2006 Rubber, vulcanized or thermoplastic - Determination of flex cracking and crack growth (De Mattia) (ISO 132.1999, MOD)

GB/T 17200-2008 Technical specification for tensile compression and flexural testing machines for rubber and plastics (constant rate of traverse) (ISO 5893.2002, IDT)

TB/T 2843-2007 General technical specification for elastic parts for railways

### **3.1 Terms**

The following terms are applicable to this Standard.

#### **3.1.1.1 Diaphragm**

The major bearing and vibration attenuation component of air spring. Its structure is shown in Figure 1. Different diaphragm types refer to Annex A.

An important component of auxiliary spring which usually consists of metal vulcanized with rubber.

#### **3.1.5.3 Support rim**

A component performs functions of supporting diaphragm, transmitting load and providing installation space for wearing plate and is between rubber metal spring and airbag, which is usually metal or metal vulcanized with rubber.

#### **3.1.6 Design height**

Working height in technical specification. It is the installation space of air spring in vertical direction. Properties at height is used as reference to assessing spring performance. This height is also the initial point for calculating vertical deflection and