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**Bogie for Rolling Stock - Bogie for Railway Wagon**

机车车辆转向架 货车转向架

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# Bogie for Rolling Stock - Bogie for Railway Wagon

## 1 Scope

This Standard stipulates the terms, definitions, main structure, basic requirements, technical requirements, inspection methods, inspection rules, marking, transportation and storage of bogie for standard gauge railway wagon.

This Standard is applicable to bogie for newly built standard gauge railway wagon, whose highest running speed is less than, or equals to 120 km/h.

## 2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB 146.1 *Rolling Stock Gauge for Standard Gauge Railways*

GB/T 699 *Quality Carbon Structural Steels*

GB/T 700 *Carbon Structural Steels*

GB/T 714 *Structural Steel for Bridge*

GB/T 1184-1996 *Geometrical Tolerancing - Geometrical Tolerance for Features without Individual Tolerance Indications*

GB/T 1222 *Spring Steels*

GB/T 1591 *High Strength Low Alloy Structural Steels*

GB/T 1804-2000 *General Tolerances - Tolerances for Linear and Angular Dimensions without Individual Tolerance Indications*

GB/T 3077 *Alloy Structure Steels*

GB/T 3278 *Hot-rolled Carbon Tool Steel Sheets and Plates*

GB/T 3280 *Cold Rolled Stainless Steel Plate, Sheet and Strip*

GB/T 3672.1-2002 *Rubber - Tolerances of Products - Part 1: Dimensional Tolerances*

TB/T 1979 *Atmospheric Corrosion Resisting Steel for Railway Rolling Stock*

TB/T 2211 *Steel Helical Spring of Suspension Mechanism for Rolling Stock*

TB/T 2235 *Rolling Bearing in the Railway Passenger Car and Wagon*

TB/T 2403 *Brake Shoes for Freight Rolling Stock of Railways*

TB/T 2429 *Technical Condition of Foundation Brake Gear Used in Railway Truck Bogie*

TB/T 2813 *Friction Damper Wedge for Freight Car*

TB/T 2817 *Technical Specification of Wrought Steel Solid Wheel for Railway Freight Car*

TB/T 2843 *General Technical Requirement for Rolling Stock Rubber to Metal Parts*

TB/T 2911 *General Technical Specification of Riveting Process for Railway Vehicle*

TB/T 2942 *General Technical Specifications of Steel Castings for Rolling Stock*

TB/T 2944 *Carbon Steel Forgings for Railway*

TB/T 2945 *Technical Specification for LZ50 Steel Shaft and Steel Billet for Railway Vehicle*

TB/T 3012 *Specification of Cast Steel Bolster and Side Frame for Railway Freight Car*

TB/T 3014 *Alloy Steel Forgings for Railway*

TB/T 3225 *Cross Bar Composition for Railway Freight Car*

TB/T 3267 *Adapter on Railway Freight Car*

TB/T 3269 *Elastic Side Bearings for Railway Freight Wagons*

TB/T 3270 *Center Wear Plate of Railway Freight Wagons*

### **3 Terms and Definitions**

What is defined in GB/T 4549.2-2004, and the following terms and definitions are applicable to this document.

#### **3.1 Frame-brace Bogie**

Frame-brace bogie refers to three-piece cast steel bogie, which implements elastic

Frame bogie refers to a running gear, which generally sets up components like wheelsets axle box device, suspension damping device and foundation brake gear; adopts bogie frame as the installation foundation of various components; bears vehicle body and loading weight; rotates in relative to the vehicle body.

**NOTE:** definition 2.17 in GB/T 4549.2-2004 is modified.

### **3.10 Bogie Frame**

Bogie frame refers to a basic bearing structure, which is between the primary and secondary suspension device, and implements the transmission of force from vehicle body to wheel and axle.

**NOTE:** definition 3.1 in GB/T 4549.2-2004 is modified.

## **4 Main Structure**

### **4.1 Frame-brace Bogie**

Frame-brace bogie belongs to three-piece cast steel bogie. It is mainly constituted of adapter, elastic positioning member, wheel and axle, side frame, central spring suspension device, swing bolster, basic braking device, frame-brace device and elastic side bearing, etc. In accordance with difference in the location of frame-brace device and swing bolster, frame-brace bogie can be divided into lower frame-brace bogie and central frame-brace bogie.

### **4.2 Swing Bogie**

Swing bogie belongs to three-piece cast steel bogie. It is mainly constituted of adapter, pedestal rocker seat (primary elastic swing device), wheel and axle, side frame, central spring suspension device, swing bolster, spring plank, rocker seat, rocker seat bearing, foundation brake gear and elastic side bearing, etc.

### **4.3 Sub-frame Radial Bogie**

Sub-frame radial bogie refers to three-piece self-guided radial bogie. It is mainly constituted of wheel and axle, side frame, central spring suspension device, swing bolster, foundation brake gear, primary rubber-metal pad, wheelsets radial device and elastic side bearing, etc.

### **4.4 Frame Bogie**

Frame bogie is a bogie, with the frame of an integral structure, which is brought together through rigid connection. It is mainly constituted of bogie frame, wheelsets axle box (axle box suspension device), foundation brake gear, traction device and elastic side bearing, etc. Generally speaking, bogie frame is integrally welded through steel plates.

- g) The clearance of the inner and outer ring round spring in the radial direction should not be less than 2.5 mm; the minimum shall not be less than 1.5 mm;
- h) In terms of bogie which has a damping device, spring's deflection margin coefficient shall be more than, or equals to 0.7. In terms of bogie which does not have a damping device, spring's deflection margin coefficient shall be more than, or equals to 0.9.

## 6 Technical Requirements

### 6.1 Material Requirements

- 6.1.1 Quality carbon structural steels shall comply with the stipulations in GB/T 699.
- 6.1.2 Carbon structural steels shall comply with the stipulations in GB/T 700.
- 6.1.3 Alloy structural steels shall comply with the stipulations in GB/T 3077 and relevant standards.
- 6.1.4 Low-alloy high-strength structural steels shall comply with the stipulations in GB/T 1591.
- 6.1.5 Structural steel for bridge shall comply with the stipulations in GB/T 714.
- 6.1.6 Atmospheric corrosion resisting steel shall comply with the stipulations in TB/T 1979.
- 6.1.7 Spring steels shall comply with the stipulations in GB/T 1222 and TB/T 2211.
- 6.1.8 Cold rolled stainless steel plate shall comply with the stipulations in GB/T 3280.
- 6.1.9 Carbon tool steel plate shall comply with the stipulations in GB/T 3278.
- 6.1.10 Seamless steel tubes for structural purposes shall comply with the stipulations in GB/T 8162.
- 6.1.11 Carbon steel castings for general engineering purpose shall comply with the stipulations in GB/T 11352.
- 6.1.12 Non-metallic materials shall comply with the stipulations of relevant standards.
- 6.1.13 The mechanical property of steel for bogie frame shall comply with the follows:
  - a) Impact absorption energy ( $KV_2$ ) ( $-40\text{ }^{\circ}\text{C}$ ) shall be more than or equals to 27 J;
  - b) Elongation at break (A) shall be more than or equals to 19%.

standards.

**6.2.16** Wheelsets assembly shall comply with the stipulations in TB/T 1718.2.

**6.2.17** Bearing pressing shall comply with the stipulations in product drawings and relevant standards.

**6.2.18** Foundation brake gear shall comply with the stipulations in TB/T 2429.

**6.2.19** Brake shoes shall comply with the stipulations in TB/T 2403 and relevant drawings.

**6.2.20** Assembled brake beam shall comply with the stipulations in TB/T 1978.

**6.2.21** Friction damper wedge shall comply with the stipulations in TB/T 2813.

**6.2.22** Cylindrical helical spring shall comply with the stipulations in TB/T 2211.

**6.2.23** Adapter and elastic positioning member shall comply with the stipulations in TB/T 3267 and relevant standards.

**6.2.24** Plane lower center plate shall comply with the stipulations in TB/T 46; spherical center plate shall comply with the stipulations in product drawings.

**6.2.25** Center wear plate shall comply with the stipulations in TB/T 3270.

**6.2.26** Elastic side bearings shall comply with the stipulations in TB/T 3269 and relevant standards.

**6.2.27** Cross bar composition shall comply with the stipulations in TB/T 3225 and relevant standards.

**6.2.28** Components like side frame column wear plate, axle box rubber spring, axle box longitudinal elastic cushion, axial rubber blanket, spring plank, rocker seat, pedestal rocker seat, rocker seat bearing, rubber-metal pad, wheelsets radial device, brake pin sleeve, brake shoe key and brake shoe ring shall comply with the stipulations in relevant stipulations.

### **6.3 Coating Requirements**

**6.3.1** Before coating, impurities (such as: oil stain, rust and electric welding splash) on the surface of various components shall be eliminated.

**6.3.2** Non-working outer surface of bogie frame shall paint anti-corrosive primer and top-coat, or, one coat for bottom and surface. The surface of forgings, structural steels, steel plate elements and profiled parts (except from friction pair parts) shall paint anti-corrosive primer and top-coat, or, one coat for bottom and surface. The internal and external surface of steel castings, center pins and wheel web, the axle body part

hole). Other parts shall not smear lubricating grease. When there are special requirements, implement product drawings.

**6.4.11** After brake shoe key is assembled, brake shoe ring shall be installed.

**6.4.12** The effect of foundation brake gear in braking and remission shall be flexible. The allowance of brake beam's safety chain shall satisfy the requirements of braking and remission in the application on vehicles.

**6.4.13** The assembly of integrated brake gear shall comply with the stipulations in relevant standards.

**6.4.14** The direction of side bearing assembly: in terms of the same bogie: opposite direction; in terms of the same vehicle: same side, same direction.

**6.4.15** In the assembly of center wear plate, impurities in the lower center plate shall be eliminated.

**6.4.16** During the assembly, no electric current is allowed to pass through rolling bearing.

## **7 Inspection Methods**

### **7.1 Inspection of Limitation Bounds**

Inspection of limitation bounds of bogie shall comply with the stipulations in GB/T 16904.1.

### **7.2 Strength Test**

**7.2.1** Strength test and stiffness test of key components of bogie shall comply with the stipulations in TB/T 1335 and relevant standards.

**7.2.2** Static load and fatigue test of swing bolster and side frame shall comply with the stipulations in TB/T 1959 and relevant standards.

**7.2.3** Static load and fatigue test of steel spring shall comply with the stipulations in TB/T 2211.

**7.2.4** Static load and fatigue test of combined-type brake beam shall comply with the stipulations in TB/T 1978.

**7.2.5** Stiffness test and fatigue test of elastic positioning members shall comply with the stipulations in TB/T 3267 and relevant standards.

**7.2.6** Stiffness test and fatigue test of elastic side bearing shall comply with the stipulations in TB/T 3269 and relevant standards.



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Contact: Wayne Zheng, [Sales@ChineseStandard.net](mailto:Sales@ChineseStandard.net)

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