

ICS 45.120
CCS S 22



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

GB/T 25021-2010

Track inspection car

轨道检查车

Issued on: September 2, 2010

Implemented on: December 1, 2010

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine;
Standardization Administration of the PRC**

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Foreword

GB/T 25021-2010 was issued on 2 September 2010 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China together with the Standardization Administration of China, and came into force on 1 December 2010. It is classified under ICS 45.120 and Chinese classification code S 22. It is a new standard and does not replace an earlier edition.

The standard was proposed by the Ministry of Railways of the People's Republic of China and is under the jurisdiction of the Standards and Metrology Research Institute of the Ministry of Railways.

Drafting organisations: the Infrastructure Inspection Centre of the Ministry of Railways and

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1 Scope

A railway track does not fail suddenly; it drifts. Sleepers settle unevenly, the ballast pumps under traffic, rail heads wear on the gauge corner in curves, and welded joints develop short-wave corrugation that no one can see by eye. Each of those defects is harmless while small and dangerous once it grows, and the growth is measured in millimetres over months across thousands of kilometres of line - far too much geometry for a walking inspector with a gauge to cover honestly, and far too fine for a train driver to feel until it is already bad. A track inspection car solves that by measuring the line at running speed: it carries instruments that record gauge, alignment, profile, cross-level, superelevation and twist continuously, records the vibration the track imparts to the car body, scans the rail head for wear and corrugation, and ties every reading to a kilometre position so that maintenance can be planned where it is actually needed. This document sets out the terminology, the technical requirements and the testing and acceptance procedures for such cars in China, covering both the vehicle itself and the measuring subsystems it carries.

This standard specifies the terms and definitions, the technical requirements and the testing and acceptance of the vehicle and of the track measuring equipment of newly built or rebuilt track inspection cars (referred to below as inspection cars).

This standard applies to inspection cars used on standard gauge railways with a design speed of not more than 200 km/h. Inspection cars used on broad gauge, metre gauge and urban light rail lines may refer to this standard.

2 Normative references

The following documents become provisions of this standard through reference in it. For dated references, subsequent amendments (excluding corrections) or revisions do not apply to this standard; however, parties who reach agreement on the basis of this standard are encouraged to investigate whether the latest editions may be used. For undated references, the latest edition applies.

GB 146.1 Standard gauge railway rolling stock gauge; GB/T 5599 Railway vehicles - Specification for evaluation the dynamic performance and accreditation test; GB/T 12817-2004 General technical specification for railway passenger cars; TB/T 1335-1996 Specification for strength design and test verification of railway vehicles; TB/T 3034-2002 Electromagnetic compatibility tests and limits for electric equipment of locomotives and rolling stock; TB/T 3138-2006 Technical specification of flame retardant materials for locomotives and rolling stock; TB/T 3139-2006 Limit of harmful substances of interior

materials and air in locomotives and rolling stock; and the Rules for the maintenance and repair of railway lines, China Railway Publishing House, 1st edition of August 2006.

3.1 Terms and definitions

For the purposes of this standard the following terms and definitions apply.

3.1.1 track geometry parameters: the parameters describing the geometric form of the track, including profile, alignment, gauge, cross-level (superelevation), twist and curve radius.

3.1.2 track characteristics value: the numerical value expressing the geometric quality of the track after the track geometry data have been assessed or computed in accordance with the relevant standards.

3.1.3 gauge: the smallest distance between the running edges of the two rails, measured within 16 mm below the running surface of the rail head.

3.1.4 alignment: the lateral irregularity of the gauge point on the inner side of the rail along the length of the track.

3.1.5 profile: the vertical irregularity of the top surface of the rail along the length of the track.

3.1.6 super-elevation: the height difference of the top surfaces of the left and right rails relative to the horizontal plane in the same cross section.

3.1.7 crosslevel: the height difference of the top surfaces of the left and right rails relative to the horizontal plane in the same cross section, excluding the superelevation value and the superelevation run-off set out for a curve.

3.1.8 twist: the torsion of the top surfaces of the left and right rails relative to the plane of the track, expressed as the algebraic difference of the cross-level values over a given base length.

3.2 Symbols

The following symbols apply in this standard.

3.2.1 A1: a wavelength of 3 m to 25 m.

3.2.2 A2: a wavelength of 25 m to 70 m, used to measure long wavelength irregularity limits. It is normally considered only where the line speed is greater than 120 km/h.

4.1 General requirements

4.1.1 The vehicle of the inspection car shall comply with the relevant requirements of GB/T 12817-2004. The interior materials of the inspection car shall comply with the relevant

requirements of TB/T 3138-2006 and TB/T 3139-2006.

4.1.2 The strength design shall comply with the provisions and relevant requirements of TB/T 1335-1996.

4.1.3 The dynamic performance of the vehicle shall comply with the provisions and relevant requirements of GB/T 5599.

4.1.4 The outline of the vehicle, including the inspection equipment and sensors mounted on it, shall not exceed the requirements of vehicle gauge 1A and vehicle gauge 1B specified in GB 146.1.

4.1.5 The inspection car shall be able to inspect in both directions, and within the range given in the technical specification the results of the track geometry measurement shall not be affected by speed or by direction of travel.

4.1.6 The track inspection system comprises the track geometry parameter measuring subsystem, the car body vibration acceleration measuring subsystem, the rail profile measuring subsystem, the rail corrugation measuring subsystem and the environment monitoring subsystem. Of these, the track geometry parameter measuring subsystem and the car body vibration acceleration measuring subsystem are mandatory; the rail profile measuring subsystem, the rail corrugation measuring subsystem and the environment monitoring subsystem are optional.

4.2 Vehicle equipment

4.2.1 Air conditioning equipment shall be fitted, meeting both working and living conditions.

4.2.2 Electric or oil-fired heating equipment shall be fitted.

4.2.3 In addition to the normal lighting, emergency lighting shall be fitted in the inspection car.

4.2.4 The car shall be equipped with a distribution cabinet, an air conditioning control cabinet, a diesel generator control cabinet, an axle temperature alarm, a direct current charger, a direct current distribution surge arrester unit, a DC48V inverter of 5 kW output, an isolating transformer, an earth leakage protector and a vehicle safety monitoring device. The capacity of the direct current charger shall meet the requirement of charging the storage battery and the starting battery of the diesel generator set (DC48V, DC24V or DC12V).

4.3 Power supply equipment

4.3.1 Two diesel generator sets shall be fitted, the rated power of a single set being not less than 32 kW at an output voltage of AC380V/50Hz.

4.3.2 A maintenance-free alkaline battery of DC48V and a capacity of not less than 300 Ah