

ICS 45.120
CCS S 17

TB

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

TB/T 1632.1-2014

**Welding of rails - Part 1: General
(English Translation)**

Issued on: October 30, 2014

Implemented on: May 1, 2015

Issued by: Ministry of Railway of PRC

Table of Contents

Foreword...	3
1 Scope...	5
2 Normative references...	5
3 Terms and definitions...	5
4 Requirements for rails for welding...	8
5 Requirements for flaw detection of welded joints...	8
6 Requirements for straightness and surface quality of welded joints...	9
7 Inspection methods for straightness and surface quality of welded joints...	11
8 Flaw detection method...	12
9 Drop weight test method...	12
10 Static bending test method...	12
11 Fatigue test method...	13
12 Tensile test method...	14
13 Impact test method...	15

Foreword

TB/T 1632 "Welding of rails" is divided into four parts.

- Part 1.General specification;
- Part 2.Flash butt welding;
- Part 3.Thermit welding;
- Part 4.Gas pressure welding.

This Part is Part 1 of TB/T 1632.

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Part replaces TB/T 1632.1-2005 "Welding of rails - Part 1.General specification".

Compared with TB/T 1632.1-2005, the main technical changes are as follows.

- MODIFY the terms and definitions (see Chapter 3; Chapter 3 of the 2005 edition);
- MODIFY the requirements for ultrasonic flaw detection (see Chapter 5; Chapter 5 of the 2005 edition);

- MODIFY the requirements for straightness of welded joints and inspection methods for straightness (see 6.1 and 7.1; 6.1 and 7.1 of the 2005 edition);
- MODIFY the requirements and test methods for surface roughness of welded joints (see 6.2.1 and 7.2.2; 6.2.1 and 7.2.2 of the 2005 edition);
- MODIFY the sampling position of heat-treated rail tensile test (see 12.1; 11.1 of the 2005 edition);
- MODIFY the sampling position of the impact test (see 13.1; 12.1 of the 2005 edition);
- MODIFY the Appendix A "Technical specification for ultrasonic flaw detection of rail welded joints" (see Appendix A; Appendix A of the 2005 edition).

This part was proposed by AND shall be under the jurisdiction of the Institute of Standards and Metrology of the Ministry of Railways.

Drafting organizations of this Part. Institute of Metals and Chemistry of China Academy of Railway Sciences, Institute of Standards and Metrology of Ministry of Railways.

1 Scope

This Part of TB/T 1632 specifies the terms and definitions, requirements for welding rails, flaw detection requirements for welded joints, straightness and surface quality requirements for welded joints of railway rail welding; inspection methods for straightness and surface quality for welded joints, flaw detection inspection methods, drop weight, static bending, fatigue, tensile, impact test methods.

This Part is applicable to new steel rails of 50 kg/m ~ 75 kg/m, which is welded by methods such as flash welding, thermite welding, gas pressure welding.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document. For undated reference documents, the latest version (including all amendments) applies to this document.

GB/T 228.1-2010 Metallic materials - Tensile testing - Part 1. Method of test at room temperature

GB/T 229-2007 Metallic materials - Charpy pendulum impact test method

GB/T 2650-2008 Impact test methods on welded joints

GB/T 2651-2008 Tensile test method on welded joints

JB/T 10061-1999 Commonly used specification for A-mode ultrasonic flaw detector using pulse echo technique

JB/T 10062-1999 Testing methods for performance of probes used in ultrasonic flaw detection

TB/T 2344-2012 Technical specifications for the procurement of 43 kg/m ~ 75 kg/m as rolled rails

TB/T 3276-2011 Rails for high speed railway

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Stationary flash-butt welding

Use the flash welder to weld the rails, at the welding station of the base or workshop rail welding line, wherein the welding power supply is supplied by the power grid through the distribution transformer.

3.2

Mobile flash-butt welding

Use the flash welder to weld the rails on the work site, wherein the welder and its supporting equipment is powered by an independent vehicle-mounted generator set.

3.3

Gas pressure welding

A welding method, in which a steel rail is heated with a gas flame and a firm joint is obtained under pressure.

4 Requirements for rails for welding

The hot-rolled rails or on-line heat-treated rails used for welding shall comply with the requirements of TB/T 2344-2012.

5.1 Qualification requirements for flaw detection personnel

Flaw detectors shall have technical qualifications of level II or above for non-destructive testing in the railway industry, AND have passed technical training on flaw detection of rail welded joints.

5.2.7 During flaw detection, the flaw detection sensitivity can be increased by 4 dB ~ 6

dB for scanning.

5.2.8 When using the 0° probe to detect the thermite welded joint, if the bottom wave

is 16 dB or more lower than the normal welded joint OR if the welded joint has the following defects, the welded joint shall be rejected.

5.3 Requirements for surface flaw detection requirements

It should use surface flaw detection methods, such as magnetic particle, penetration, eddy current, to detect cracks on the surface of joints.

6.1 Straightness requirements

See Table 1 for the straightness requirements of the 1 m length of the rail head working face of the rail welding joint; no low joints shall appear.

6.2.1 After the shape finishing of the welded joint is finished, within 1 m of the weld

seam as the center, the surface roughness of the top surface of the rail shall meet the following requirements. no more than 0.2 mm in any 200 mm section; when the design speed $v > 160$ km/h, it should not be greater than 0.1 mm in any 100 mm section. (There is no surface roughness requirement for the pits in the unground area of the base metal surface).

6.2.2 There shall be no cracks, obvious indentations, scratches, bruises, electrode burns,

grinding burns, or other damages on the welded joints and the surface of the nearby