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

TB 10461-2019

**Technical Regulations for Dynamic Acceptance for Mixed
Passenger and Freight Railways Construction
(English Translation)**

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China**

Table of Contents

Foreword...	3
1 Scope...	5
2 Normative references...	5
3 Requirements...	5
4 Inspection methods...	9
5 Inspection rules...	11
Annex A (Informative) Operation records for thermit welding of rails...	15
Annex B (Normative) Measurement method for width of softened zone...	16

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 3 of TB/T 1632.

This Standard was drafted in accordance with the provisions given in GB/T 1.1-2009.

This Part replaces TB/T 1632.3-2005 Welding of rails - Part 3.Thermit welding.

Compared with TB/T 1632.3-2005, the major technical changes are as follows.

- MODIFY the material requirements for thermit welding (SEE 3.2 in this edition and 3.2 in 2005 edition);
- MODIFY the personnel requirements for thermit welding (SEE 3.3 in this edition and 3.3 in 2005 edition);
- ADD the storage requirements and shelf lives of the flux and sand mold that shall be included in the process manual (SEE 3.4 in this edition);
- CANCEL the requirement for the percentage elongation after fracture, A

$\geq 2.0\%$; CANCEL the requirement for the impact properties, KU2 $\geq 6.0\text{J}$;
CANCEL the description that no delivery conditions are made for the
percentage elongation after fracture, A, and the impact energy, KU2 (SEE

3.5 in this edition and 3.5 in 2005 edition);

- MODIFY the inspection method (SEE Chapter 4 in this edition and Chapter 4 in 2005 edition);
- CANCEL the impact test in the test method (SEE 4.6 in 2005 edition);
- MODIFY the inspection rules (SEE Chapter 5 in this edition and Chapter

5 in 2005 edition).

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

Welding of rails - Part 3.Thermit welding

1 Scope

This Part of TB/T 1632 specifies the requirements, inspection methods and
inspection rules for the thermit welding of rails.

This Part is applicable to the thermit welding of 50 kg/m ~ 75 kg/m rails.

2 Normative references

The following documents are essential to the application of this document. For
dated references, only the editions with the dates indicated are applicable to
this document. For undated references, only the latest editions (including all the
amendments) are applicable to this document.

GB/T 230.1-2009 Metallic materials - Rockwell hardness test - Part 1.Test
method (scales A, B, C, D, E, F, G, H, K, N, T)

GB/T 231.1-2009 Metallic materials - Brinell hardness test - Part 1.Test
method

GB/T 4340.1-2009 Metallic materials - Vickers hardness test - Part 1.Test
method

GB/T 8170 Rules of rounding off for numerical values & expression and judgement of limiting values

GB/T 13298 Inspection methods of microstructure for metals

TB/T 1632.1-2014 Welding of rails - Part 1.General specification

TB/T 3322-2013 Alumino-thermic welding consumables for rail

3.1 Welding rail requirements

The new rails for thermit welding shall meet the requirements of Chapter 4 in TB/T 1632.1-2014.

3.2 Welding material requirements

The materials for thermit welding of rails shall meet the requirements of TB/T 3322-2013.

3.3 Personnel requirements

Each welding operator shall hold a job training certificate issued by the technical institution approved by the railway authority.

3.4.1.1 The thermit welding process shall be implemented according to the process manual provided by the supplier.

3.4.1.2 The supplier shall specify the required equipment, consumable materials and detailed method of operation in the manual. The following contents shall also be included.

- a) number of main operators;
- b) instructions for welding equipment;
- c) flux corresponding to the rails of different grades and models;
- d) preparation of rail ends and rail gap size;
- e) detailed preheating parameters;
- f) time range from the ignition of the flux to the casting of the molten steel;
- g) the temperature at which the train is allowed to pass the welded joint;
- h) requirements for welding environment (such as temperature, humidity, wind

power, etc.);

- i) storage requirements and shelf lives of the flux and sand mold;
- j) safety precautions.

3.4.2 Welding records

Welding operators shall document the welding process. REFER to Annex A for the records. Records shall be retained for an overhaul period.

3.4.3 Joint marking

The welded joints (finished products) of each rail shall be marked. The markings shall be 1m to 3m away from the welds. In addition, the markings shall be clear, upright and identifiable for at least 5 years (or 1 overhaul cycle). The marking method shall ensure that the welded joints (finished products) of each rail are traceable based on the operation records.

4.1 Appearance inspection

The methods for inspecting the flatness and surface quality shall meet the requirements of Chapter 7 in TB/T 1632.1-2014.

4.2 Flaw detection

The flaw detection methods shall meet the requirements of Chapter 8 in TB/T 1632.1-2014.

4.3 Static bending test

The specimen requirements and test methods shall meet the requirements of Chapter 10 in TB/T 1632.1-2014. The connector shall be loaded until it breaks.

4.4 Fatigue test

The specimen requirements and test methods shall meet the requirements of Chapter 11 in TB/T 1632.1-2014.