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**NATIONAL STANDARD OF THE
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Replacing GB/T 13925-2010

Metallographic test method for high manganese cast steel

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Table of Contents

Foreword...	3
1 Scope...	5
2 Normative References...	5
3 Terms and Definitions...	5
4 Sampling Method...	6
5 Microstructure...	6
6 Carbide Rating...	7
7 Grain Size Rating...	12
8 Non-metallic Inclusion (oxide + sulfide) Rating...	13

Foreword

This document was drafted in accordance with the rules provided in GB/T 1.1-2020 Directives for Standardization - Part

1. Rules for the Structure and Drafting of Standardizing Documents. This document serves as a replacement for GB/T 13925-2010 Metallographs for High Manganese Cast Steel. In comparison with GB/T 13925-2010, apart from structural adjustments and editorial modifications, the main technical changes are as follows:

- a) The scope is modified (see Chapter 1; Chapter 1 of Version 2010);
- b) The term and definition of average diameter are added (see 3.1);
- c) The sampling method is modified (see Chapter 4; Chapter 3 of Version 2010);
- d) The microstructure photograph of cast high manganese steel after water-toughening treatment is modified (see Chapter 5; Chapter 4 of Version 2010);
- e) The carbide rating requirements and microstructure photographs are modified (see Chapter 6; Chapter 5 of Version 2010);
- f) The non-metallic inclusion (oxide + sulfide) rating requirements and microstructure photographs are modified (see Chapter 8; Chapter 7 of Version 2010). Please be noted that certain content of this document may involve patents. The institution issuing this document does not undertake the responsibility of identifying these patents. This document was proposed by and shall be under the jurisdiction of National Technical Committee 54 on Foundry of Standardization Administration of China (SAC/TC 54). The drafting organizations of this document. Jinan University; Zhengzhou Dingsheng High-tech New

Energy Engineering Technology Co., Ltd.; Maanshan Haitian Heavy Industry Technology Development Co., Ltd.; Zhejiang Huasheng Castings Metal Products Co., Ltd.; China Railway Baoji Bridge Group Co., Ltd.; Guangdong Torch Test Co., Ltd.; CITIC Heavy Industries Co., Ltd.; Zhejiang Wujing Machine Manufacture Co., Ltd.; Guangdong Taibang Wear Resistant Metal Technology Ltd.; Zhumadian Hengjiu New Wear-resistant Materials Co., Ltd.; Suichang Dexin Casting Steel Co., Ltd.; Shaoguan Qirui Environmental Protection Equipment Co., Ltd.; Shandong Tianli Machinery Casting Co., Ltd.; Zhejiang Suijin Special Casting Co., Ltd.; Tongling University; Chengde Rongmao Steel Casting Co., Ltd.; Jiangsu Jinyang Machinery Co., Ltd.; China Academy of Machinery Shenyang Research Institute of Foundry Co., Ltd.; Sanming Yijun Machinery Casting Co., Ltd.; Jiangsu Wanheng New Material Technology Co., Ltd.; Qingzhou Jukai Industrial Equipment Co., Ltd.; Hualin Special Steel Group Co., Ltd.; Baoji Chushi Metal Detection Co., Ltd.; Hubei Gucheng County Donghua Machinery Co., Ltd. Metallographic Test Method for High Manganese Cast Steel

1 Scope

GB/T 13925-2025 is the Chinese national standard on metallographic test method for high manganese cast steel, in the field of metallurgy. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 30 June 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 January 2026.

Classification: ICS 77.040.01, CCS J31. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document specifies the metallographic sampling methods and microstructure, as well as the basis for evaluating the carbide content, grain size and non-metallic inclusion grade of high manganese cast steel. This document applies to the metallographic test of water-toughened austenitic manganese steel castings, except for medium manganese steel ZG120Mn7Mo, as specified in GB/T 5680. The metallographic test of other water-toughened high manganese cast steel may take this as a reference.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. 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/T 5611 Foundry Terminology

GB/T 5680 Austenitic Manganese Steel Castings

GB/T 6394 Determination of Estimating the Average Grain Size of Metal

GB/T 13298-2015 Inspection Methods of Microstructure for Metals

GB/T 40805-2021 Steel Castings - General Technical Delivery Requirements

3 Terms and Definitions

The terms and definitions defined in GB/T 5611 are applicable to this document.

3.1 average diameter The average dimension of the major and minor axes of the particles.
NOTE. the dimension of the major axis refers to the maximum dimension of the particles, and the dimension of the minor axis refers to the maximum dimension perpendicular to the major axis.

4 Sampling Method

4.1 Specimens shall be cut from the casting, its attached test block, or a single-cast test block. Metallographic observation may also be performed directly on the casting. The specific sampling location of the casting or its attached test block shall be agreed upon by the supply-side and the demand-side. The shape and dimensions of the single-cast test block shall conform to the requirements of Figure 1 in GB/T 40805-2021. Unless otherwise agreed upon by the supply-side and the demand-side, the supply-side may select any type of single-cast test block. Metallographic specimens from attached test blocks or single-cast test blocks shall be taken at least 6 mm from the casting surface.

4.2 Specimens shall be protected from thermal effects during cutting and preparation.

4.3 Specimen dimensions shall comply with the inspection surface area specified in GB/T 13298-2015, with an inspection area of less than 400 mm².

5 Microstructure

The microstructure of high manganese cast steel after water-toughening treatment shall be austenite (see Figure 1) or austenite with a small number of carbides.

6 Carbide Rating

6.1 Etching agent. 4% nital, glycerol mixed acid (HNO₃. HCl. glycerol = 1. 2. 3), and supersaturated picric acid can be used.

6.2 Magnification. 500.

6.3 Field of view for evaluation. 80 mm (actual field of view for evaluation. 160 m). The most

severe field of view is selected for evaluation.

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