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

GB/T 4138-2024

Rare earth ferrosilicon magnesium alloy

稀土镁硅铁合金

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Foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting: This document replaces GB/T 4138-2015 "Rare Earth Magnesium Ferrosilicon Alloys": Compared with GB/T 4138-2015, except for structural adjustments and editing In addition to the changes in performance, the main technical changes are as follows:

- a) The scope of application has been changed (see Chapter 1, Chapter 1 of the:2015 edition);
- b) Added classification (see Chapter 4);
- c) The chemical composition requirements have been changed (see 5:1, 3:1 of the:2015 edition);
- d) Added requirements for product particle size range (see 5:2);
- e) Added the condition requirement of "under natural diffuse light" (see 6:3);
- f) Added product quality inspection method (see 7:1:1);
- g) Changed the rules for "sampling" (see 7:4, 5:4 of the:2015 edition);
- h) Changed the packaging requirements (see 8:1, 6:2 of the:2015 edition);
- i) The marking, transportation and storage have been changed (see 8:2, 6:1, 6:3 and 6:4 of the:2015 edition);
- j) Added "accompanying documents" (see 8:3): Please note that some of the contents of this document may involve patents: The issuing organization of this document does not assume the responsibility for identifying patents: This document was proposed and coordinated by the National Rare Earth Standardization Technical Committee (SAC/TC229): This document was drafted by: Ganzhou Nonferrous Metallurgy Research Institute Co., Ltd., Inner Mongolia Shengquan Keliyuan New Materials Technology Co., Ltd., Baotou Rare Metallurgy Research Institute Co., Ltd: Soil Research Institute, Ningxia Fenghua Industrial Co., Ltd., Baotou Huashang Rare Earth Alloy Co., Ltd., Ruike Rare

Earth Metallurgy and Functional Materials National Engineering Center Co., Ltd., Longnan Long Yttrium Heavy Rare Earth Technology Co., Ltd., and Guorui Kechuang Rare Earth Functional Materials (Ganzhou) Co., Ltd: The main drafters of this document are: Hong Kan, Xu Jianbing, Liu Yanfen, Liang Xin, Ma Hankun, Li Zhongqi, Wang Guangxin, Zhou Baolu, Wu Ying, Zhang Jikai, Li Zhenye, Zhang Xianheng, Lü Weidong, Liu Hongli, Jiang Shan, Wang Youzhen, Jia Guangwen, Yang Qing, Xiao Yong, Wang Weisheng, and Liu Weizhen: The previous versions of this document and the documents it replaces are as follows:

---First published as GB/T 4138-1984 in 1984, first revised in:1993, second revised in:2004, third revised in:2015 revision;

---This is the fourth revision: Rare Earth Magnesium Silicon Ferroalloy

1 Scope

China's national standard for rare earth ferrosilicon magnesium alloy. It specifies the classification, the technical requirements and the test methods. This is the nodulariser: the alloy added to molten iron to make ductile iron, in which graphite forms as spheres rather than flakes and the metal gains the toughness that grey iron lacks. Magnesium is what does it, and adding magnesium to molten iron is difficult because it boils at 1090 degrees C, far below the iron's temperature, so pure magnesium added to a ladle erupts. Alloying it with ferrosilicon dilutes and moderates the reaction so that the magnesium dissolves rather than flashing off. The rare earth addition alongside it neutralises the trace elements - lead, bismuth, antimony, titanium - that interfere with nodule formation and that arrive with scrap steel in the charge. Between them they make ductile iron reliably producible from a variable feedstock, which is why the alloy is specified as a product.

This document specifies the classification, technical requirements, test methods, inspection rules and packaging, marking, transportation and storage of rare earth magnesium ferrosilicon alloy products: and accompanying documents: This document is applicable to the preparation of light rare earth magnesium ferrosilicon alloys and yttrium-based heavy rare earth magnesium ferrosilicon alloys used as spheroidizers and vermicularizers by the melt-matching method:

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document: For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document:

GB/T 8170 Rules for rounding off values and expression and determination of limit values

GB/T 13247 Sampling and testing methods for particle size of ferroalloy products

GB/T 15676 Rare Earth Terminology

GB/T 16477 (all parts) Chemical analysis methods for rare earth ferrosilicon alloys and magnesium ferrosilicon alloys

GB/T 24194 Determination of ferrosilicon, aluminum, calcium, manganese, chromium, titanium, copper, phosphorus and nickel content - Inductively coupled plasma atomic emission spectrometry

GB 39176 Packaging, marking, transportation and storage of rare earth products

3 Terms and definitions

The terms and definitions defined in GB/T 15676 and the following apply to this document:
3:

- 1 An iron alloy with mixed rare earths, magnesium, silicon and iron as the main components, mainly lanthanum or cerium: 3:
- 2 An iron alloy with mixed rare earths, magnesium, silicon and iron as the main components, mainly yttrium: 3:
- 3 Mix-melting method A method of obtaining an alloy by heating raw materials and flux using fuel or electrical energy to melt them at a certain temperature:

4 Categories

- 1 Brand Rare earth magnesium ferrosilicon alloy can be divided into light rare earth magnesium ferrosilicon alloy and yttrium-based heavy rare earth magnesium ferrosilicon alloy: Yttrium-based heavy rare earth magnesium-silicon ferrosilicon alloys are divided into 14 grades according to their chemical composition: 4:
- 2 Brand designation method Rare earth magnesium ferrosilicon alloy grades are divided into three levels, the first level represents rare earth magnesium ferrosilicon alloy, using the chemical symbol of rare earth magnesium ferrosilicon