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

GB/T 20567-2020

Replacing GB/T 20567-2006

Vanadium-nitrogen alloy

钒氮合金

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard replaces GB/T 20567-2006 "Vanadium Nitrogen Alloy". Compared with GB/T 20567-2006, the main technical changes of this standard as follows:

- The reference standard for chemical analysis methods of vanadium-nitrogen alloys has been added (see Chapter 2);
- Include VN19 brand products into the standard (see 3.1);
- Modified the vanadium content requirements of VN12 and VN16 products (see 3.1, 3.1 in the.2006 edition);
- Modified the particle size requirements of the product (see 3.3, the.2006 edition of 3.3);
- Modified sampling and sample preparation methods (see 4.1, 4.2, 4.1 in.2006 edition);
- Modified the particle size determination method (see 4.5, 4.4 in the.2006 edition);
- Modified the batch requirements (see 5.1, 5.2 of the.2006 edition);
- Modified the packaging, marking, storage, transportation and quality certificate regulations (see Chapter 6, Chapter 6 of the.2006 edition). This standard was proposed by the China Iron and Steel Association. This standard is under the jurisdiction of the National

Pig Iron and Ferroalloy Standardization Technical Committee (SAC/TC318). Drafting organizations of this standard. Pangang Group Co., Ltd., Hegang Chengde Vanadium and Titanium New Materials Co., Ltd., Chengde Yanbei Metallurgical Materials Co., Ltd., National Vanadium and Titanium Products Quality Supervision and Inspection Center, China Metallurgical Construction Research Institute Co., Ltd., Metallurgical Industry Information Standards Institute. The main drafters of this standard. Zhou Kaizhu, Li Xiufeng, Wang Yonggang, Li Lanjie, Wang Xueyuan, Peng Yicun, Huang Pingsheng, Bai Fengren, Liu Yajian, Yang Xinneng, Fang Lin, Lu Mingliang, Huang Xiaoli, You Benyin, Lu Chunsheng. The previous versions of the standard replaced by this standard are as follows:

---GB/T 20567-2006. Vanadium Nitrogen Alloy

1 Scope

China's national product standard for vanadium-nitrogen alloy. It specifies the technical requirements, the test methods, the inspection rules, the packaging, marking, storage and transport and the quality certificate, and it applies to vanadium-nitrogen alloy used in steelmaking and casting. Vanadium is added to steel as a microalloying element, in amounts of a tenth of a per cent or less, to precipitate fine carbonitrides that pin the grain boundaries and strengthen the steel by precipitation and grain refinement at the same time. It is one of the cheapest ways to raise the strength of a structural steel, and it is why a modern rebar or a pipeline steel reaches its grade at a composition that is still weldable. But vanadium alone is only half the reaction: the precipitate that does the work is a carbonitride, and nitrogen is needed to form it. Adding vanadium as ferrovanadium to a steel with little nitrogen wastes a large part of it. Vanadium-nitrogen alloy supplies both together in a fixed ratio, which raises the vanadium yield substantially and means less vanadium is needed for the same strength - a direct saving in the most expensive addition in the ladle. The standard therefore specifies not just the vanadium content but the nitrogen content and the ratio between them, since that ratio is what the product is bought for, together with the carbon, the impurities, the density and the particle size, which determines how the alloy dissolves and how much of it is lost in the slag or the fume. The sampling and acceptance rules matter here because the material is expensive and traded on assay. Issued on 28 April 2020 and in force since 1 August 2020, it replaces GB/T 20567-2006.

This standard specifies the technical requirements, test methods, inspection rules, packaging, marking, storage, transportation and quality certification of vanadium-nitrogen alloys Books etc. This standard applies to vanadium-nitrogen alloys used in steelmaking and casting.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated

references, the latest version (including all amendments) applies to this document.

GB/T 191 Packaging, Storage and Transportation Graphic Mark

GB/T 24583.1 Vanadium-nitrogen alloy-Determination of vanadium content-Ferrous ammonium sulfate titration method

GB/T 24583.2 Determination of nitrogen content of vanadium-nitrogen alloy inert gas fusion thermal conductivity method

GB/T 24583.3 Determination of nitrogen content of vanadium-nitrogen alloy Distillation-neutralization titration method

GB/T 24583.4 Determination of carbon content of vanadium-nitrogen alloy by infrared absorption method

GB/T 24583.5 Vanadium-nitrogen alloy-Determination of phosphorus content-Bismuth phosphorus molybdenum blue spectrophotometric method

GB/T 24583.6 Determination of sulfur content of vanadium-nitrogen alloy by infrared absorption method

GB/T 24583.7 Determination of oxygen content of vanadium-nitrogen alloy by infrared absorption method

GB/T 24583.8 Vanadium-nitrogen alloy determination of silicon, manganese, phosphorus, aluminum content inductively coupled plasma atomic emission spectrometry

3 Technical requirements

3.1 Brand and chemical composition Vanadium-nitrogen alloy is divided into three grades VN12, VN16 and VN19 according to different chemical compositions, and its chemical composition should meet the requirements of Table 1.

Note. The supplier can provide the test results of oxygen, aluminum, silicon, and manganese content after negotiation between the supplier and the buyer and indicated in the contract.

3.2 Apparent density The apparent density of VN12 and VN16 products should not be less than 3.0g/cm³, and the apparent density of VN19 products should not be small In 2.6g/cm³.

3.3 Granularity The particle size of the product should not be greater than 50mm, and the particle size of less than 10mm should not be greater than 5% of the total. According to user requirements, after negotiation between the supplier and the buyer and indicated in the contract, vanadium-nitrogen alloys with other particle size requirements can also be supplied.

4.1 Sampling

4.1.1 Sampling in the packaging drum Each batch randomly select 3 small bags of products in no less than 6 packaging drums, and randomly take 5 complete material balls in each bag, and all the materials taken After being combined into a large sample, the samples required for chemical analysis are reduced and separated. Large sample size should not be less than 2500g, when the sample size is insufficient or the batch is less than 6 packages When using the barrel, randomly take a sample from any packaging barrel to make up. In addition, one small bag of product is randomly selected from the packaging barrel of each batch of chemical analysis samples, and all the samples taken are combined into a large sample and used as Samples for particle size measurement.

4.1.2 Sampling in the bag No less than 5 small bags of products are randomly selected from each packaging bag of each batch of products, and 15 complete balls are randomly selected in each bag. The balls are all combined into a large sample and then the sample required for chemical analysis is reduced. The volume of the large sample should not be less than 2500g. Take a sample from any packaging bag to make up. In addition, no less than 1 small bag of product is randomly selected from each packaging bag of each batch of products, and all the samples taken are combined into a large sample as the particle size Sample for measurement.

4.2 Sample preparation The test sample preparation process is shown in Figure 1. Figure

4.3 Chemical analysis methods

4.3.1 The determination method of vanadium content is carried out in accordance with GB/T 24583.1.

4.3.2 The determination method of nitrogen content shall be carried out in accordance with GB/T 24583.2 or GB/T 24583.3.

4.3.3 The determination method of carbon content shall be carried out in accordance with the provisions of GB/T 24583.4.

4.3.4 The determination method of phosphorus content shall be carried out in accordance with GB/T 24583.5 or GB/T 24583.8.

4.3.5 The determination method of sulfur content shall be carried out in accordance with the provisions of GB/T 24583.6.

4.3.6 The oxygen content determination method shall be carried out in accordance with the provisions of GB/T 24583.7.

4.3.7 The determination method of aluminum, silicon and manganese content shall be carried out in accordance with the provisions of GB/T 24583.8.