ICS 73.060.10
CCS D 31

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 27692-2024

Replacing GB/T 27692-2011

Iron pellets for blast furnaces

高炉用铁球团矿

Issued on: April 25, 2024 **Implemented on: November 1, 2024**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

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2 Normative references

The following documents contain provisions which, through normative reference in this text, constitute provisions of this document. For dated references only the edition corresponding to that date applies; for undated references the latest edition, including all amendments, applies.

The list comprises the parts of GB/T 6730 for the determination of total iron, silicon, calcium and magnesium, sulfur, phosphorus, carbon and the multi-element methods, namely GB/T 6730.5, 6730.9, 6730.10, 6730.13, 6730.14, 6730.16, 6730.17, 6730.18, 6730.19, 6730.20, 6730.61, 6730.62, 6730.63, 6730.65, 6730.66, 6730.70, 6730.73 and 6730.74; GB/T 8170 on rounding of numerical values and the expression and judgement of limiting values; GB/T 10322.1 on sampling and sample preparation of iron ores and GB/T 10322.7 on the determination of size distribution by sieving; GB/T 13240 on the determination of the free swelling index of iron ore pellets for blast furnaces; GB/T 13241 on the determination of reducibility of iron ores; GB/T 13242 on the low temperature disintegration test with a cold tumbler after static reduction; GB/T 14201 on the determination of the crushing strength of iron pellets for blast furnace and direct reduction; GB/T 20565 on terminology for iron ore and direct reduced iron; GB/T 24531 on the determination of the tumbler and abrasion indices of iron ores for blast furnace and direct reduction; and YB/T 5142 on the packaging, marking, transport, storage and quality certificate of metallurgical mineral products.

3 Terms and definitions

The terms and definitions given in GB/T 20565 and the following apply to this document.

3.1 pelletizing - the operation in which prepared raw material, that is finely ground concentrate or other finely ground powdered material together with additives or binders, is

proportioned, mixed and rolled on a balling machine to form green balls of a given size, which are then made to undergo a series of physical and chemical changes by drying and roasting or by other methods so that they consolidate into balls or lumps.

3.2 pellets - spherical artificial lump ore made from fine ore by cold or hot bonding and consolidation. Note: the balls are usually made from fine ore smaller than 100 μm with various additives.

3.3 iron pellets - pellets produced from iron concentrate, iron ore fines or iron bearing powder material.

3.4 acid iron pellets - iron pellets whose basicity, the ratio of the mass of calcium oxide to the mass of silicon dioxide, is less than 0.6.

3.5 fluxed iron pellets - iron pellets whose basicity is not less than 0.6 and less than 1.0.

3.6 alkaline iron pellets - iron pellets whose basicity is not less than 1.0.

3.7 magnesian iron pellets - iron pellets whose magnesium oxide content is not less than 1.5 % by mass.

4 Classification and grades

4.1 According to the content of acidic and basic oxides, iron pellets are divided into acid iron pellets, fluxed iron pellets, alkaline iron pellets and magnesian iron pellets.

4.2 According to the chemical composition, the metallurgical properties and the physical indices of the finished ore, iron pellets are graded first class, second class and third class.

5 Technical requirements

The chemical composition of the iron pellets shall meet Table 1, the metallurgical properties shall meet Table 2 and the physical characteristics shall meet Table 3.

Table 1, chemical composition as mass fraction in per cent, gives for each type and grade the total iron, the silicon dioxide, the sulfur, the phosphorus, the magnesium oxide and the basicity. Acid iron pellets: first class, total iron not less than 65.0, silicon dioxide not more than 3.5, sulfur not more than 0.02, phosphorus not more than 0.03, magnesium oxide not specified, basicity below 0.6; second class, 63.0, 5.0, 0.06, 0.06, not specified, basicity below 0.6; third class, 60.0, 7.0, 0.10, 0.10, not specified, basicity below 0.6. Fluxed iron pellets: first class, 65.0, 3.0, 0.02, 0.03, not specified, basicity not less than 0.6 and below 1.0; second class, 63.0, 4.0, 0.06, 0.06, not specified, same basicity range; third class, 60.0, 6.0, 0.10, 0.10, not specified, same basicity range. Alkaline iron pellets: first class, 65.0, 3.0, 0.02, 0.03, not specified, basicity not less than 1.0; second class, 63.0, 4.0, 0.06, 0.06, not specified, basicity not less than 1.0; third class, 60.0, 5.0, 0.10, 0.10, not specified, basicity not less than 1.0. Magnesian iron pellets: first class, 65.0, 3.0, 0.02, 0.03, magnesium oxide

not less than 1.5, basicity not specified; second class, 63.0, 4.0, 0.06, 0.06, magnesium oxide not less than 1.5, basicity not specified; third class, 60.0, 5.0, 0.10, 0.10, magnesium oxide not less than 1.5, basicity not specified. Note: where the purchaser has requirements for other chemical constituents, these may be agreed with the supplier and noted in the contract.

Table 2, metallurgical properties, gives for each type and grade the reduction swelling index, the reducibility index and the low temperature reduction disintegration index for the fraction above 3.15 mm. Acid iron pellets: first class, swelling index not more than 15.0, reducibility index not less than 72.0, disintegration index not less than 90.0; second class, 20.0, 68.0, 85.0; third class, 22.0, 63.0, 80.0. Fluxed iron pellets: first class, 15.0, 80.0, 85.0; second class, 20.0, 75.0, 80.0; third class, 22.0, 70.0, 75.0. Alkaline iron pellets: first class, 15.0, 80.0, 85.0; second class, 20.0, 75.0, 80.0; third class, 22.0, 70.0, 75.0. Magnesian iron pellets: first class, 15.0, 78.0, 85.0; second class, 20.0, 72.0, 80.0; third class, 22.0, 67.0, 75.0.

Table 3, physical characteristics of iron pellets, gives for each grade the crushing strength in newtons per pellet, the tumbler index for the fraction above 6.3 mm as a mass fraction, the abrasion index for the fraction below 0.5 mm as a mass fraction, and the size as the mass fraction between 8 mm and 16 mm and the mass fraction below 5 mm. First class: crushing strength not less than 2500 N per pellet, tumbler index not less than 92.0 %, abrasion index not more than 5.0 %, fraction of 8 mm to 16 mm not less than 95.0 %, fraction below 5 mm not more than 3.0 %. Second class: 2300 N per pellet, 90.0 %, 6.0 %, 90.0 %, 4.0 %. Third class: 2000 N per pellet, 86.0 %, 8.0 %, 85.0 %, 5.0 %.

6 Test methods

6.1 The total iron content is analysed in accordance with GB/T 6730.5, GB/T 6730.65, GB/T 6730.66, GB/T 6730.70 and GB/T 6730.73.

6.2 The silicon dioxide content is analysed in accordance with GB/T 6730.9 and GB/T 6730.10.

6.3 The sulfur content is analysed in accordance with GB/T 6730.16, GB/T 6730.17 and GB/T 6730.61.

6.4 The phosphorus content is analysed in accordance with GB/T 6730.18, GB/T 6730.19 and GB/T 6730.20.

6.5 The calcium oxide content is analysed in accordance with GB/T 6730.13, GB/T 6730.14, GB/T 6730.62 and GB/T 6730.63.

6.6 The magnesium oxide content is analysed in accordance with GB/T 6730.62, GB/T 6730.63 and GB/T 6730.74.

6.7 The reduction swelling index is determined in accordance with GB/T 13240.

6.8 The reducibility index is determined in accordance with GB/T 13241.

6.9 The low temperature reduction disintegration index is determined in accordance with GB/T 13242.

6.10 The crushing strength is determined in accordance with GB/T 14201.

6.11 The tumbler index and the abrasion index are determined in accordance with GB/T 24531.

6.12 The size is determined in accordance with GB/T 10322.7.

7 Inspection rules

7.1 Sampling and sample preparation of the iron pellets follow GB/T 10322.1.

7.2 Iron pellets of the same variety, from the same supplying unit and arriving at the same time form an inspection lot of 3000 t; a quantity of less than 3000 t also forms one inspection lot.

7.3 The total iron content, the silicon dioxide content, the basicity, the magnesium oxide content, the crushing strength and the size are the routine inspection items.

7.4 The tumbler index, the abrasion index, the reduction swelling index, the reducibility index and the low temperature reduction disintegration index may be inspected periodically or by random sampling as agreed between supplier and purchaser.

7.5 Where the purchaser objects to the quality, the matter is settled by agreement between supplier and purchaser.

7.6 Rounding of numerical values follows GB/T 8170.

8 Packaging, transport, storage and quality certificate

8.1 The packaging, marking, transport, storage and quality certificate of the iron pellets shall meet the requirements of YB/T 5142.

8.2 The supplier shall provide a quality certificate for each lot of product; the certificate shall state the name of the supplier, the name of the product, the inspection lot number, the mass, the date of despatch and the results of each inspection item specified in this document.