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

YS/T 63.25-2012

**Carbonaceous materials used in the production of aluminium.
Part 25: Cathode blocks. Determination of expansion due to
sodium penetration without application of pressure**

铝用炭素材料检测方法 第25部分：无压下底部炭块钠膨胀率的测定
(English Translation)

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Foreword

YS/T 63 "Carbonaceous material for aluminum," a total of 26 parts.

- Part 1. firing process, firing weightlessness measurement sample measurement cathode paste and green specimens apparent density;
- Part 2. Determination of cathode blocks and prebaked anodes room temperature resistivity;
- Part 3. Determination of the thermal conductivity of Comparative Law;
- Part 4. Determination of thermal expansion coefficient;
- Part 5. Determination of pressure at the bottom there is sodium expansion of carbon block;
- Part 6. Determination of open porosity hydrostatic law;
- Part 7. Determination of apparent density size method;
- Part 8. Determination of density in xylene Pyknometer;
- Part 9. Determination of true density of helium hydrometer method;
- Part 10. Determination of air permeability;
- Part 11. Determination of the reactivity to air mass loss method;
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- Part 13. Determination of Young's modulus of the static measurement method;
- Part 14. Determination of flexural strength of three-point method;
- Part 15. Determination of compressive strength;
- Part 16. Determination of Trace Elements in X-ray fluorescence spectrometry method;

- Part 17. Determination of volatile matter;
- Part 18. Determination of moisture content;
- Part 19. Determination of ash content;
- Part 20. Determination of sulfur;
- Part 21. cathode paste firing the expansion/contraction of determination;
- Part 22. Determination of equivalent temperature roasting degree method;
- Part 23. Determination of the reactivity to air prebaked anode thermal gravimetry;
- Part 24. Determination of the reactivity prebaked anode carbon dioxide thermal gravimetry;
- Part 25. Determination of no pressure sodium expansion of the bottom of the carbon block;
- Part 26. Determination of refractories cryolite penetration ability.

Part is divided into 25 sections.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This section is non-arbitration.

This section uses the translation method identical with ISO 15379.2:2004 "carbonaceous materials used in the production of aluminum carbon block bottom - Part 2. No Pressure at the bottom of the carbon block expansion of the sodium determination. " This part of ISO 15379.2:2004 made the following editorial changes.

- Remove the ISO 15379.2:2004 directory, preface, introduction;
- Standard name in accordance with the requirements of this series of standards has been modified.

The non-ferrous metal part by the National Standardization Technical Committee (SAC/TC243) centralized.

This section is responsible for drafting units. Aluminum Corporation of China Zhengzhou Research Institute, China Nonferrous Metals Industry Quality Standards and Metrology Institute the study.

Participated in the drafting of this section. Beijing Science and Technology Co., Ltd. British Spike, Shanxi Jinyang Carbon Co., Ltd., Shandong Nanshan Aluminum shares Limited copies.

1 Scope

YS/T of the provisions of section 63 of the aluminum cathode blocks due to sodium penetration caused by the linear expansion coefficient (ie, sodium expansion) measurement method.

This section applies to the determination of aluminum cathode carbon block linear expansion due to sodium penetration (ie sodium expansion) caused by linear expansion also depends Sampling in the direction of anisotropy.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

Accuracy ISO 5725-2 test methods and results - Part 2. Standard Methods of measurement repeatability and reproducibility of the measurement of the basic square France (Accuracy (trueness and precision) of measurement methods and results - Part 2. Basic method for the determination of repeatability and reproducibility of a standard measurement method) ISO 8007-1 carbonaceous materials used in aluminum sampling methods - Part 1. Bottom charcoal
(Carbonaceous materials for the production of aluminium - Sampling plans and sampling from individual units - Part 1. Cathode blocks)

3 PRINCIPLE OF THE METHOD

1, the sample is immersed in the bottom of the carbon block graphite crucible initial molecular ratio of 4.0 or molten cryolite electrolyte. The entire the system was heated to $980\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, in order to 0.7 A/cm^2 current density electrolysis 2h. The use of a probe into the sample pores measured sodium Expansion.

4 Test device

Sodium expansion measuring test device schematic shown in Figure 1, including the following sections.

4.1

Muffle furnace. capable of heating to $980\text{ }^{\circ}\text{C}$, the molten salt temperature gradient less than $10\text{ }^{\circ}\text{C}$.

4.2

muffle furnace temperature control device. For temperature controlled at $980\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

4.3

temperature measuring device. such as thermocouples, type K or S type is appropriate, at 980 °C when the measurement error of ± 5 °C.

4.4

graphite crucible. diameter 90mm, height 90mm, as an anode.

4.5

Brass. diameter 14mm, inner diameter of 12mm, brass as the sample stage and measuring the expansion rate of the reference material. At the same time the power of the sample Between the wires. Brass should end with a threaded, the length of time should be sufficient to meet the bottom of the crucible when the sample is placed on the brass can be extended out of the furnace.

4.6

expansion rod. diameter 5mm, used to measure the expansion rate of the sample. Expansion rods into the sample hole, and extending brass.

4.7

measuring devices. to observe the expansion process, the range of 10mm, the precision within the range of 1 μ m, may be connected to a computer or by loggers.

4.8

Crucible base. heat-resistant steel, the anode current from the power supply to reach the graphite crucible.

4.9

graphite powder. can improve conductivity between the base and the crucible.