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

YS/T 63.13-2016

Replacing YS/T 63.13-2006

**Carbonaceous materials used in the production of
aluminium-Part 13: Determination of elastic modulus**

铝用炭素材料检测方法 第13部分：弹性模量的测定

(English Translation)

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Foreword

YS/T 63 "aluminum carbon material testing method" is divided into the following 27 sections.

- Part 1. Cathode paste firing method, Determination of weight loss and determination of apparent density of green samples;
- Part 2. Determination of room temperature resistivity of cathode carbon block and prebaked anode;
- Part 3. Determination of thermal conductivity comparison method;
- Part 4. Determination of thermal expansion coefficient;
- Part 5. There is a determination of the bottom of the carbon expansion coefficient of carbon expansion;
- Part 6. Determination of open porosity hydrostatic method;
- Part 7. Determination of apparent density size method;
- Part 8. Determination of density in xylene pycnometer method;
- Part 9. Determination of true density Helium hydrometer method;
- Part 10. Determination of air permeability;
- Part 11. Determination of air reactivity quality loss method;
- Part 12. Prebaked anode CO₂ Reactivity Determination of mass loss method;
- Part 13. Determination of elastic modulus;
- Part 14. Determination of flexural strength three-point method;

- Part 15. Determination of compressive strength;
- Part 16. Determination of trace elements X-ray fluorescence spectrometry;
- Part 17. Determination of volatiles;
- Part 18. Determination of moisture content;
- Part 19. Determination of ash content;
- Part 20. Determination of sulfur content;
- Part 21. Cathode paste baking expansion/contraction determination;
- Part 22. Determination of the degree of baking equivalent temperature method;
- Part 23. Determination of prebaked anode air reactivity; Thermogravimetric method;
- Part 24. Prebaked anode CO₂ reactivity Determination of thermal gravimetric method;
- Part 25. There is a determination of the bottom of the carbon expansion coefficient of sodium;
- Part 26. Determination of refractory material resistance to cryolite penetration;
- Part 27 - Determination of prebaked anode fracture energy.

This part of YS/T 63 Part 13.

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

This Part replaces YS/T 63.13-2006 "Carbonaceous materials for aluminum - Part 13 Determination of elastic modulus," and YS/T 63.13-2006 compared to the main changes are as follows.

--- Refer to ISO 18142:2014 "Aluminum Carbon Materials Prebaked Anode Resonance Method for Determination of Dynamic Modulus of Elasticity", Added Acoustic Resonance Act as Method 2 (see Chapter 4).

This part of the National Non-ferrous Metals Standardization Technical Committee (SAC/TC243) and focal point.

This part of the main drafting unit. China Aluminum Zhengzhou Nonferrous Metal Research Institute Co., Ltd., non-ferrous metal technology and Economy Research Institute.

This section participates in the drafting unit. Aluminum Corporation of China Guizhou Branch, Jinan O-Carbon Co., Ltd., cable through the development of shares Co., Ltd., Shandong Chenyang New Carbon Materials Co., Ltd., Zhengzhou Haoyu Carbon Materials Co., Ltd., Ningxia Ningping Carbon Co., Ltd.

Division, Shandong Yankuang Carbon Products Co., Ltd., Feicheng Changsheng Special Graphite Co., Ltd.

1 Scope

YS/T 63 provisions of this part of the cathode carbon block in the range of 10 °C ~ 35 °C, pre-baked anode elastic modulus measurement method.

This section applies to the cathode in the range of 10 °C ~ 35 °C, prebaked anode elastic modulus determination.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version applies to this article Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 8170 revised data and rules limit the value of the rules and judgments GB/T 26297.1 Sampling methods for carbonaceous materials for aluminum - Part 1. Bottom carbon blocks GB/T 26297.2 Sampling methods for carbonaceous materials for aluminum - Part 2. Side carbon blocks Sampling methods for carbonaceous materials for aluminum - Part 3. Prebaked anodes YS/T 63.7 Carbon materials for aluminum - Part 7. Determination of apparent density Size method

3.1 Method summary

Young's modulus is a measure of the relationship between stress σ and deformation ϵ in a region of elastic deformation under the action of an external force. The value is the ratio of σ to ϵ , denoted E .

3.2 Instruments

3.2.1

Test equipment refers to the device that can measure the stress and strain of materials, generally by the force equipment, dynamometer, measuring deformation instrument, data processing (Such as computers, microprocessors, etc.). External force exerted by the force equipment in the sample, the use of dynamometer to measure external force, by measuring deformation instrument the deformation of the sample is measured, by a data processor, collected, calculated and the test results are obtained. Incline equipment to be able to provide suitable Static load external loading system (according to the maximum load to determine the appropriate range); Dynamometer can reflect the load on the sample value of the measuring and indication system (according to the final load to determine the maximum force scale); measuring deformation instrument can measure the sample within the elastic deformation of small deformation of the instrument (range and the final deformation to adapt to the measurement accuracy of 1 μ m).

3.2.2

length measuring equipment. Vernier caliper or micrometer, the accuracy of 0.02mm.

3.3 Sample

3.3.1

The cathode carbon block and prebaked anode were sampled according to GB/T 26297.1, GB/T 26297.2 and GB/T 26297.3, respectively. Sample rule Inch diameter $50\text{mm} \pm 2\text{mm}$, length $50\text{mm} \pm 0.1\text{mm}$, both ends of the vertical axis should be vertical.

3.3.2

The sample was dried at $120\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ 12h, then cooled to room temperature.