



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

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Code for Design of Aluminum Smelter Processes

铝电解厂工艺设计规范

(English Translation)

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Foreword

This code was compiled by Guiyang Aluminum Magnesium Design and Research Institute Co., Ltd. jointly with the organizations concerned, in accordance with the requirements of the "Notice on Printing and Distributing the Plan for Formulating and Revising Engineering Construction Standards and Codes in 2006 (Second Batch)" (Jianbiao [2006] No. 136) issued by the former Ministry of Construction.

During the compilation of this code, the drafting group carried out in-depth and detailed investigation and research, carefully summarized practical experience, referred to related domestic codes and advanced international standards, and, on the basis of wide solicitation of opinions, finalized the code after review.

This code consists of 16 chapters. The main technical contents are: general provisions, terms, main materials and product quality, electrolysis process calculation, design of reduction cells, potroom, process automation control, substation and rectifier station, anode rodding shop, storage, transport and feeding of alumina, fluoride salts and electrolyte, potroom fume treatment, process calculation of aluminium ingot casting, arrangement of aluminium ingot casting shop, tapping crucible cleaning, waste residue treatment and storage yard, and reduction cell repair and auxiliary repair of electrolysis.

The provisions printed in bold type in this code are mandatory provisions and shall be strictly implemented.

The Ministry of Housing and Urban-Rural Development is in charge of the administration of this code and the explanation of the mandatory provisions; China Nonferrous Metals Industry Engineering Construction Standards Administration Office is responsible for its routine management; and Guiyang Aluminum Magnesium Design and Research Institute Co., Ltd. is responsible for the explanation of specific technical contents. Any comments or suggestions arising during the implementation of this code should be sent to Guiyang Aluminum Magnesium Design and Research Institute Co., Ltd. (address: No. 2 Jinzhu Road, Jinyang New District, Guiyang, Guizhou Province; postcode: 550081) for reference in future revision.

Chief development organizations: Guiyang Aluminum Magnesium Design and Research Institute Co., Ltd.; China Nonferrous Metals Industry Engineering Construction Standards Administration Office

Participating development organizations: Shenyang Aluminum and Magnesium Engineering and Research Institute Co., Ltd.; Guizhou Branch of Aluminum Corporation of China Limited; Qingtongxia Aluminum Co., Ltd.

1 General provisions

1.0.1

This code is formulated in order to meet the needs of the construction of aluminium smelter projects, improve the quality of engineering design and promote the safety and reliability, advanced applicability and economic rationality of aluminium smelters, in compliance with the relevant national laws, regulations and standards.

1.0.2

This code is applicable to the process design of new, expanded and technically renovated aluminium smelters.

1.0.3

Aluminium reduction cells must adopt the prebaked anode aluminium reduction cell process of 200 kA and above.

1.0.4

Aluminium smelters shall, in accordance with the provisions of the current industry standard "Cleaner production standard - Primary aluminum industry" HJ/T 187, take measures for the simultaneous treatment of harmful pollutants in waste gas, waste water and waste residue, and shall reduce the emission of the greenhouse gases perfluorocarbons.

1.0.5

Aluminium smelters shall be built close to power plants or substations. In areas where conditions permit, downstream processing industries should be extended, and clean energy

such as natural gas or coal-based natural gas should be used for production.

1.0.6

The process design of aluminium smelters shall comply not only with this code but also with the provisions of the current relevant national standards.

2.0.1 prebaked anode cell

Its characteristic is that the anodes are qualified formed carbon blocks produced by forming and baking in a prebaked anode plant, which are used on the cell after rodding. Its main advantages are that pitch fume and fluorides are treated separately, and that the cell lends itself to mechanized and automated operation and to centralized and effective treatment of potroom fume and dust.

2.0.2 fluorinated alumina

Fluorine-bearing alumina formed after fresh alumina, used as the adsorbent for the harmful component fluorides in potroom fume, has cyclically absorbed the hydrogen fluoride and solid fluoride particles in the fume in a dry scrubbing system.

2.0.3 anode current density

Characteristic index ratio obtained by dividing the current intensity of an aluminium reduction cell by the sum of the areas of all anode carbon blocks on the cell, expressed in amperes per square centimetre.

2.0.4 partially graphitiferous cathode block

Cathode carbon block in whose dry aggregate formulation the proportion of added artificial graphite is lower than 30%.

2.0.5 baking, starting up

The two production processes that a reduction cell must undergo at the initial stage of being put into production: preheating of the lining, and start-up by pouring in high-temperature liquid electrolyte so that the cell gradually enters the aluminium-producing state.

2.0.6 computer room

Main computer room of the automatic control system for the operation and management of all the reduction cells of the whole potline.