



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

GB 51020-2014

**Code for design of ventilation dedusting and fume scrubbing of
aluminum smelter**

铝电解厂通风除尘与烟气净化设计规范

(English Translation)

Issued on: July 13, 2014

Implemented on: May 1, 2015

**Issued by: Ministry of Housing and Urban-Rural Construction of the
People's Republic of China**

Table of Contents

1	General provisions
2	Terms
3	Basic requirements for ventilation and dedusting
3.1	Ventilation
3.2	Dedusting
3.3	Ventilation and dedusting equipment
3.4	Air ducts and others
3.5	Automatic control
3.6	Noise reduction and vibration isolation
4	Electrolysis production system
4.1	Pot room
4.2	Butt cooling room
4.3	Cast house
4.4	Ladle cleaning room
4.5	Anode assembly
4.6	Pot repair and auxiliary repair
4.7	Storage and conveying of alumina and fluoride salts
4.8	Power distribution installations
4.9	Rectifier station
5	Carbon production system
5.1	Raw material storage
5.2	Pitch melting
5.3	Calcination
5.4	Green anode and green cathode manufacture
5.5	Baking and carbon block transport
5.6	Treatment of returned material
5.7	Graphitization
5.8	Machining
6	Auxiliary and ancillary facilities
6.1	Water supply and drainage facilities
6.2	Power facilities
6.3	Public utilities and ancillary buildings

7 Basic requirements for fume scrubbing

7.1 General arrangement

7.2 Alumina conveying and metering

7.3 Scrubbing equipment

7.4 Fume exhaust ducts

7.5 Stack

7.6 Operation monitoring and control

7.7 Safety facilities

8 Electrolysis fume scrubbing

8.1 Types of pollutants, emission quantities and scrubbing efficiency

8.2 General arrangement

8.3 Basic design parameters

8.4 Fume exhaust system and equipment

9 Baking fume scrubbing

9.1 Pollutants and emission quantities of baking fume

9.2 Baking fume scrubbing system

9.3 Ducts and equipment arrangement of the baking fume scrubbing system

Explanation of wording in this code

List of quoted standards

Addition: Explanation of provisions

Foreword

This code was prepared by China Nonferrous Metals Engineering Co., Ltd. and Shenyang Aluminum and Magnesium Engineering and Research Institute Co., Ltd. jointly with the relevant organizations, according to the requirements of the "Notice on Printing and Distributing the Plan for the Formulation and Revision of Engineering Construction Standards and Codes in 2010" (Jianbiao [2010] No. 43) issued by the Ministry of Housing and Urban-Rural Development.

During the preparation of this code, the drafting group carried out extensive investigation and research on domestic aluminium electrolysis enterprises, carefully summarized practical experience, referred to advanced experience at home and abroad, and widely solicited the opinions of the relevant design, scientific research and production organizations; through repeated discussion it drew up the draft for approval, which was finally submitted to the Ministry of Housing and Urban-Rural Development for examination and finalization.

This code consists of 9 chapters, and the main technical contents are: general provisions, terms, basic requirements for ventilation and dedusting, electrolysis production system, carbon production system, auxiliary and ancillary facilities, basic requirements for fume scrubbing, electrolysis fume scrubbing, and baking fume scrubbing.

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 interpretation of the mandatory provisions, the Administration Office of Engineering Construction Standards of the China Nonferrous Metals Industry is responsible for the routine management, and Shenyang Aluminum and Magnesium Engineering and Research Institute Co., Ltd. is responsible for the explanation of the specific technical contents. Any comments or suggestions arising during the implementation of this code should be sent to Shenyang Aluminum and Magnesium Engineering and Research Institute Co., Ltd. (address: No. 184 Heping North Street, Shenyang; postcode: 110001) for reference in future revision.

Chief development organizations: China Nonferrous Metals Engineering Co., Ltd.; Shenyang Aluminum and Magnesium Engineering and Research Institute Co., Ltd.

Participating development organizations: Guiyang Aluminum and Magnesium Design and Research Institute Co., Ltd.; Liancheng Branch of Aluminum Corporation of China Limited; Gansu Academy of Civil Engineering Science.

Participating organization: Jiehua Holding Co., Ltd.

1 General provisions

1.0.1

This code is formulated with a view to raising the design level of ventilation dedusting and fume scrubbing in aluminium smelters and achieving advanced technology, safety and reliability, environmental protection and energy saving, economic rationality and convenient management.

1.0.2

This code is applicable to the design of ventilation dedusting and fume scrubbing works for new, expanded and reconstructed aluminium smelters, and for the production workshops and auxiliary facilities of anode and cathode manufacturing plants for aluminium electrolysis.

1.0.3

For the production process design related to ventilation dedusting and fume scrubbing, processes, technologies and equipment that generate no or little hazardous substances

shall be adopted.

1.0.4

The design of ventilation dedusting and fume scrubbing shall adopt efficient, energy-saving and safe technologies, processes and equipment. Treatment measures shall be taken for the waste water, waste materials and waste residues of the systems, which shall be returned to the production system where they meet production requirements. Ventilation dedusting and fume scrubbing facilities shall be interlocked with the related production process systems or equipment.

1.0.5

The equipment level of the ventilation dedusting and fume scrubbing design should not be lower than that of the process design, and the facilities shall be designed, constructed and put into production simultaneously with the main project.

1.0.6

The design of ventilation dedusting and fume scrubbing of aluminium smelters shall comply not only with this code but also with the provisions of the relevant current national standards.

2.0.1 pollution source of fume (dust)

Location where fume (dust) is generated.

2.0.2 harmful gas

Gas emitted in the production process that pollutes the environment.

2.0.3 fume

Process waste gas generated by reduction cells and baking furnaces in the production process.

2.0.4 ventilation

Technical measure by which air is brought into or exhausted from a room by natural or mechanical means in order to meet air environment requirements such as hygiene and safety; it consists of exhaust hoods, fans, ducts, air inlets and air outlets, etc.

2.0.5 dedusting

Technical measure for the cleaning treatment of dust generated in the production process of an aluminium smelter; it consists of gas collecting and dust suction hoods, ducts, dust collectors, dust discharge devices, fans, exhaust stacks, etc.