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Replacing GB 29140-2012

Norm of energy consumption per unit production of soda ash

纯碱单位产品能源消耗限额

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Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020 "*Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents*".

This document replaces GB 29140-2012 "*The norm of energy consumption per unit product of soda ash*". Compared with GB 29140-2012, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

a) ADD level of allowance value of energy consumption (see Clause 4 of this document);

b) DELETE advanced values of energy consumption per unit production of soda ash production facilities (see 4.3 of the 2012 edition);

c) MODIFY the statistical scope and calculation methods of energy consumption (see Clause 6 of this document, 5.1 of the 2012 edition);

d) DELETE "Energy-saving technologies and management measures" (see Clause 6 of the 2012 edition).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The issuing authority of this document shall not be held responsible for identifying any or all such patent rights.

This document was proposed by and shall be under the jurisdiction of National Standardization Administration.

This document was first issued in 2012, this is the first revision.

Norm of energy consumption per unit production of soda ash

1 Scope

This document specifies the technical requirements, statistical scope and calculation methods for the allowance value of energy consumption per unit production of soda ash (hereinafter referred to as energy consumption).

This document applies to the calculation and assessment of energy consumption of soda ash products (including light soda ash and heavy soda ash) of soda ash production enterprises using the ammonia-soda process, the combined soda process and the natural soda process, as well as the energy consumption control of new and rebuilt and expanded projects.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 210 Sodium carbonate for industrial use

GB/T 2589 General rules for calculation of the comprehensive energy consumption

GB/T 3484 The general principles for energy balance of enterprise

GB/T 5462 Industrial salt

GB/T 12723 General principles for establishing allowance of energy consumption per unit throughput

GB/T 28749 The method of drawing energy balance network diagram for enterprises

GB/T 28751 The method of editing energy balance table for enterprises

GB/T 29116 General principles for calculation of raw material consumption in industrial enterprises

carbonate and sodium bicarbonate as raw materials.

[b] The classification of industrial salt is defined in accordance with GB/T 5462.

[c] According to different raw materials, combined soda process is divided into refined industrial salt as raw material and solar industrial salt as raw material. The level of comprehensive energy consumption for per ton of soda ash of the combined soda process production enterprise using solar industrial salt as raw material is divided according to 1.18 times the value of the combined soda process in the table.

5 Technical requirements

5.1 Limit value of energy consumption per unit production of soda ash

Limit value of energy consumption per unit production of light soda ash and heavy soda ash of existing soda ash production facilities shall comply with the requirements of level 3 in Table 1.

5.2 Access value of energy consumption per unit production of soda ash

Access value of energy consumption per unit production of light soda ash and heavy soda ash of new, rebuilt and expanded soda ash production facilities shall comply with the requirements of level 2 in Table 1.

6 Statistical scope and calculation methods

6.1 Statistical scope of comprehensive energy consumption of soda ash products

6.1.1 The statistical scope of comprehensive energy consumption of soda ash products includes various energy such as primary energy and secondary energy actually consumed, including energy used as raw materials. The various energy actually consumed are calculated in accordance with GB/T 3484, GB/T 28749, GB/T 28751, etc.

6.1.2 The consumption of raw materials for soda ash is calculated in physical quantity, and the actual consumption is calculated in accordance with GB/T 29116.

6.1.3 The statistical scope covers the energy consumption of all major production systems, auxiliary production systems and subsidiary production systems from raw material processing to the storage of soda ash products, including accident losses, equipment maintenance, start-up and shutdown, and annual overhaul processes. For natural soda process, it includes the energy consumption of the brine mining process, excluding the energy consumption of project construction processes such as infrastructure, technical transformation, and excluding the energy consumption of calcium chloride, baking soda, synthetic ammonia, ammonium nitrate, ammonium chloride drying and thermal power production processes affiliated with the soda ash facilities.

6.1.4 For combined soda enterprises using concentrated gas to make soda, the energy consumption of the ammonia decarbonization process is counted in that of synthetic ammonia, and the energy consumption of the low-pressure machine that transports carbon dioxide to the combined soda enterprises is counted in that of combined soda. For combined soda enterprises using shift gas to make soda, the energy consumption of the compressor is counted in that of synthetic ammonia, and the energy consumption of the booster installed before or after the soda ash carbonization tower is counted in that of combined soda.

6.1.5 Materials and energy recovered during the production process are not deducted, and their consumption is not calculated separately when used in this system; when output to an external system, the output energy shall be counted in the output energy and deducted from the comprehensive energy consumption (such as vapor, hot water, etc.).

6.1.6 The energy consumed by the necessary safety and environmental protection measures in the production of soda ash shall be counted in the energy consumption. For example: energy consumption for sewage treatment, security, etc.

6.1.7 Raw gas and public works (such as vapor, circulating water, etc.) shared by multiple users shall be reasonably allocated for various consumptions.

6.1.8 Various energy shall be converted into kilogram coal equivalent in accordance with GB/T 2589. The calorific value of various energy shall be based on the calorific value actually measured by the enterprise during the reporting period. If there are no actual measurement conditions, refer to the reference coal equivalent conversion coefficient of various energy given in Annex A.

6.1.9 Energy-consuming medium (such as water, oxygen, nitrogen, compressed air, etc.) used in production, whether purchased or self-produced, shall be counted in the energy consumption. If it is a self-produced energy-consuming media, the energy consumed by the production of the energy-consuming media shall be calculated according to the actual consumption (electricity, vapor, etc.); if it is a purchased energy-consuming media, the energy input into the system shall be converted according to the measured value or the reference coal equivalent conversion coefficient of main energy-consuming medium given in Annex B (if there is no measured value).

6.2 Calculation of soda ash output

During the statistical reporting period, products that meet all the indicators of GB/T 210 after inspection (including re-inspection) by the factory-level quality department are counted in the soda ash output. If the quality of self-used soda ash products meets the requirements of GB/T 210, it can be counted in the output, and the product output is calculated in physical quantity.

6.3 Calculation methods

6.3.1 The comprehensive energy consumption of light soda ash products is calculated according to formula (1):

$$E_q = \sum_{i=1}^{n} (E_i \times k_i) \quad \cdots\cdots (1)$$

where:

E_q - the comprehensive energy consumption of light soda ash products, in kilogram coal equivalent (kgce);

n - the number of energy varieties consumed within the light soda ash production boundary;

E_i - the physical quantity of the ith energy consumed in the light soda ash production process;

k_i - the coal equivalent conversion coefficient of the ith energy.

6.3.2 The comprehensive energy consumption for per ton of light soda ash is calculated according to formula (2):

$$e_q = \frac{E_q}{M_q + M_o} \quad \cdots\cdots (2)$$

where:

e_q - the comprehensive energy consumption for per ton of light soda ash, in kilogram coal equivalent per ton (kgce/t);

E_q - the comprehensive energy consumption of light soda ash products, in kilogram coal equivalent (kgce);

M_q - the output of qualified light soda ash products, in tons (t);

M_o - the amount of light soda ash consumed in the production of heavy soda ash (including the physical quantity of soda ash converted from the system's self-produced alkali liquid), in tons (t).

6.3.3 The comprehensive energy consumption of heavy soda ash products is calculated according to formula (3):

$$E_z = \sum_{j=1}^{n} (E_j \times k_j) \quad \cdots\cdots (3)$$

where:

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