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Energy consumption for products of lithium salt

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Energy consumption for products of lithium salt

1 Scope

This document stipulates the requirements, statistical scope, calculation method, calculation scope, energy-saving management and measures for the energy consumption per unit product of lithium salt (hereinafter referred to as energy consumption) limits.

This document is applicable to the calculation and assessment of product energy consumption of manufacturers, that use spodumene concentrate, lepidolite concentrate, brine as raw materials to produce lithium salts, such as lithium hydroxide, lithium carbonate or lithium chloride, as well as the energy consumption control of newly built projects.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, for dated reference documents, only the version corresponding to the date applies to this document; for undated reference documents, the latest version (including all amendments) applies to this document.

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

GB 17167 General principle for equipping and managing of the measuring instrument of energy in organization of energy using

3 Terms and definitions

The terms and definitions as defined in GB/T 2589, as well as the following terms and definitions, apply to this document.

3.1

Unit energy consumption in working procedure

The energy consumed by the production enterprise to produce qualified products during the production technology.

3.2

E_{ZG} - Energy consumption of various product technology;

E_{ZF} - Energy consumption and losses in indirect auxiliary production departments;

E_{ZZ} - Comprehensive energy consumption of all products.

All types of energy consumed shall not be recalculated or omitted. Where there is a supply and demand relationship, the input and output parties shall be consistent in the calculated values. The energy consumption of equipment shutdown and overhaul shall also be included in the calculation; meanwhile it shall be evenly distributed on a monthly basis, according to the operation cycle of the equipment after the overhaul. The comprehensive energy consumption of enterprises is calculated in accordance with the provisions of GB/T 2589.

Note: The energy consumption planned by the enterprise during the reporting period refers to the energy consumption directly used for production during the statistical period of this plan.

5.1.3 Measurement of physical energy amount

The measurement of physical energy amount shall comply with the Measurement Law of the People's Republic of China and GB 17167.

5.1.4 Measurement units of various energy sources

The units of enterprise production energy consumption, product technology energy consumption (or product direct comprehensive energy consumption), product comprehensive energy consumption: kgce, tce (kilogram standard coal, ton standard coal);

Units of coal, coke, heavy oil: t, 10⁴ t (ton, 10000 tons);

Units of electricity: kW·h, 10⁴ kW·h (kilowatt hours, ten thousand kilowatt hours);

Units of steam: kg, t or kJ, GJ (kilogram, ton or kilojoule, million kilojoules);

Units of gas, compressed air, oxygen: m³, 10⁴ m³ (cubic meters, 10000 cubic meters);

Units of water: t, 10⁴ t (ton, 10000 tons).

5.1.5 Methods for converting various energy sources (including energy consumed in the production of energy-consuming working fluids) into standard coal amount

The application of energy with a low (bit) calorific value equal to 29.3076 MJ (megajoules) is called 1 kg of standard coal.

For externally purchased energy, the actual measured low (bit) calorific value or the actual measured value provided by the supplier can be used as the basis for calculation, OR it can be converted using the conversion coefficient of the national statistics

department, as shown in Appendix A. Secondary energy and energy-consuming working fluids are converted according to the corresponding energy equivalent value: when the enterprise converts energy to self-production, the amount of standard coal is converted according to the actual physical amount of energy input; when it is sold and supplied by a centralized production enterprise, its energy equivalent value shall be as specified by the competent authority; when it is purchased or sold, the energy equivalent values shall be the same; when the energy equivalent values are not provided, they can be converted according to the conversion coefficient of the national statistics department, as shown in Appendix B. The waste heat recovered by the enterprise is based on the conversion coefficient of heat; the waste heat power generation is uniformly based on the conversion coefficient of electricity.

5.1.6 Determination of product output per unit product energy consumption

To calculate the product output of lithium salt per unit product energy consumption, it shall use the output of qualified lithium salt within the same planned reporting period.

All product outputs are based on data, which is officially reported by the enterprise planning and statistics department.

5.1.7 Calculation principles for energy consumption in waste heat utilization

The waste heat recovered by the enterprise belongs to energy saving and recycling; it does not belong to purchased energy. When calculating energy, it shall avoid double counting with purchased energy. The energy used by the waste heat recovery device is included in the energy consumption of the technology or procedure. The heat or power generation recovered from waste heat in each technology or procedure shall be deducted, if it is output to this technology or procedure. If the recovered heat or power generation is consumed or used in this technology or procedure, there shall be no energy consumption deduction in this technology or procedure. The amount of waste heat recovery deducted shall not be double-counted. When it is supplied to other procedure, it shall be included in the normal energy consumption in the technology used. The recovered energy shall be deducted in the procedure and technology of recovering waste heat, after being converted into standard coal. If the energy consumption indicator for waste heat recovery has not been deducted, it shall be marked as “Waste heat recovery energy has not been deducted”.

5.1.8 Others

Indirect comprehensive energy consumption includes: a) The energy consumption of indirect assistant and auxiliary production systems; b) the loss of energy and energy-consuming working fluids in the internal storage, conversion, distribution, supply, sale of the enterprise, shall be distributed to each product, according to the ratio -- of the technology energy consumption of each product TO the energy consumption of the production technology of the enterprise.

The comprehensive unit energy consumption of the technology is calculated according to formula (5):

$$E_Z = E_I + E_F \quad \dots\dots\dots (5)$$

Where:

E_Z - The comprehensive unit energy consumption of a certain product, in tons of standard coal per ton (tce/t);

E_I - The unit energy consumption of technology of a certain product, in tons of standard coal per ton (tce/t);

E_F - The indirect assistant energy consumption and loss allocation amount of a certain product, in tons of standard coal per ton (tce/t).

5.3 Calculation range

5.3.1 Calculation range of product energy consumption of spodumene lithium extraction technology enterprises

5.3.1.1 Lithium hydroxide production technology

The calculation range of energy consumption of lithium hydroxide technology products includes various energy, which is consumed in the entire production technology from the preparation of roasted spodumene concentrate to the output of finished lithium hydroxide, including the production of by-product sodium sulfate, waste water, waste residue treatment.

5.3.1.2 Production technology of lithium carbonate

The calculation range of energy consumption of lithium carbonate technology products includes various energy, which is consumed in the entire production technology from the preparation of roasted spodumene concentrate to the output of finished lithium carbonate, including the production of by-product sodium sulfate, waste water, waste residue treatment.

5.3.1.3 Production technology of lithium chloride

The calculation range of energy consumption of lithium chloride technology products includes various energy, which is consumed in the entire production technology, from the preparation of roasted spodumene concentrate to the output of finished lithium chloride, including the production by-products sodium chloride, calcium sulfate, wastewater, waste residue management.

5.3.2 Calculation range of product energy consumption of lepidolite lithium extraction technology enterprises

Production technology of lithium carbonate: The calculation range of energy consumption of lithium carbonate technology products includes the amount of various energy, which is consumed in the entire production technology, from the preparation of roasted lepidolite concentrate to the output of finished lithium carbonate, including the production of by-products sodium sulfate, wastewater, waste residue management.

5.3.3 Calculation range of product energy consumption of brine lithium extraction technology enterprises

5.3.3.1 Production technology of lithium carbonate

The calculation range of energy consumption of lithium carbonate technology products includes various energy, which is consumed in the entire production technology, from the preparation of old brine (40% lithium chloride solution) to the output of finished lithium carbonate, including production by-products sodium chloride, wastewater, waste residue treatment.

5.3.3.2 Production technology of lithium chloride

The calculation range of energy consumption of lithium chloride technology products includes various energy, in the entire production technology from the preparation of old brine (40% lithium chloride solution) to the output of finished lithium chloride, including the production of by-product sodium chloride, wastewater, waste residue treatment.

6 Energy saving management and measures

6.1 Basic energy saving management

6.1.1 Enterprises shall establish an energy-saving assessment system, to regularly assess the energy consumption of each production technology of the enterprise, meanwhile break down the assessment indicators to each grassroots organization.

6.1.2 Enterprises shall establish an energy consumption statistics system as required, establish documents and files of energy consumption calculations and statistical results, conduct controlled management of documents.

6.1.3 Enterprises shall be equipped with corresponding energy measurement instruments and establish an energy measurement management system, in accordance with the requirements of GB 17167.

6.2 Energy-saving technology management

6.2.1 Lithium salt production enterprises shall carry out technological transformation; develop or promote the application of advanced production technology, to improve production efficiency and energy utilization.

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