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**The Norm of Energy Consumption per Unit Production of
Lithium**

金属锂单位产品能源消耗限额

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The Norm of Energy Consumption per Unit Production of Lithium

1 Scope

This Document stipulates the requirements, statistical range, calculation range, calculation method, and energy-saving management and measures for the norm of energy consumption per unit production of lithium in lithium smelting enterprises.

This Document is applicable to the calculation and assessment of energy consumption of products of lithium smelting enterprises, as well as the energy consumption control of new projects; and is also applicable to the assessment of energy consumption of enterprise upgraded product processes.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 2589 General principles for calculation of total production energy consumption

GB/T 4369 Lithium

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

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

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in GB/T 2589 and GB/T 12732 and the following apply.

3.1 Unit energy consumption in working procedure

All types of energy consumed shall not be recalculated or omitted. When there is a supply and demand relationship, the input and output sides shall be consistent in the calculated values. The energy consumption when the equipment is shut down for maintenance shall also be included in the calculation, and be evenly allocated every month according to the operation cycle after the maintenance.

The waste heat recovered by the enterprise does not belong to purchased energy. When calculating product working procedure and technology energy consumption, recalculation with purchased energy shall be avoided from the purchased energy. The energy used by the waste heat utilization device is included in the product working procedure and technology energy consumption. The portion of recovered energy for self-use shall be included in the object consumption of the self-use working procedure. When it is transferred to other working procedure, it shall be included in the normal consumption in the used working procedure. The recovered energy after being converted into standard coal shall be deducted from the waste heat recovery working procedure and technology energy consumption. If it contains energy consumption indicators for recovering waste heat, it shall be marked with "including waste heat power generation" or similar words.

5.1.3 Measurement of object energy amounts

The measurement of object energy amounts shall comply with the provisions of the *Law on Metrology of the People's Republic of China* and GB 17167.

5.1.4 Measurement units of various energies

The measurement units of various energies are as follows:

- a) The units of enterprise production energy consumption, product technology energy consumption, and product integrate energy consumption: kgce, tce (kilograms of standard coal, tons of standard coal);
- b) Units of coal, coke, and heavy oil: kg, t, 10^4 t (kg, ton, 10,000 tons);
- c) Unit of electricity: kW·h, 10^4 kW·h (kilowatt hour, ten thousand kilowatt hours);
- d) Units of gas, compressed air, and oxygen: m^3 , 10^4 m^3 (cubic meters, 10,000 cubic meters);
- e) Units of water: t, 10^4 t (tons, 10,000 tons).

5.1.5 Methods of various energy conversion to standard coal

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

For externally purchased fuel energy, the actual measured low calorific value or the actual measured value provided by the supplier can be used as the basis for calculation; or it can be converted by the conversion coefficient of the national statistics department, see Appendix A.

Secondary energy and energy-consuming medium are converted according to the corresponding energy equivalent value. When an enterprise converts energy to self-production, the amount of standard coal shall be converted according to the actual object amount of energy input. When it is exported and supplied by a centralized production organization, its energy equivalent values shall be stipulated by the competent department. When it is purchased and exported, its energy equivalent values shall be the same. When energy equivalent values are not provided, it can be converted according to the conversion coefficient of the national statistics department, see Appendix B.

5.1.6 Determination of product output per unit product energy consumption

5.1.6.1 The annual data of energy consumption per unit product of lithium smelting enterprises is calculated by dividing the sum of energy consumption in each month by the weighted average of the output in each month. Products are divided into crude metallic lithium, industrial-level metallic lithium, and battery-level metallic lithium. Crude metallic lithium refers to metallic lithium directly produced by electrolysis of lithium chloride. Among the designations specified in GB/T 4369, Li-4, Li-5, and Li-6 are industrial-level metallic lithium. Li-1, Li-2, and Li-3 are battery-level metallic lithium.

5.1.6.2 To calculate the output of qualified crude metallic lithium products, the output of qualified crude metallic lithium within the statistical period of the unified plan shall be used.

5.1.6.3 To calculate the output of qualified industrial-level metallic lithium products, the output of qualified industrial-level metallic lithium products within the statistical period of the unified plan shall be used.

5.1.6.4 To calculate the output of qualified battery-level metallic lithium products, the output of qualified battery-level metallic lithium products within the statistical period of the unified plan shall be used.

5.1.7 Others

The energy consumption of indirect auxiliary and ancillary production systems and the loss of energy and energy-consuming medium in the enterprise's internal storage, conversion, distribution, supply and export, that is, indirect integrate energy consumption, shall be allocated to each product according to the percentage of energy consumption of each product technology in the energy consumption of enterprise's production technology.

The energy consumption of the annual equipment overhaul shall be included in the product technology energy consumption, and evenly distributed to each maintenance energy-consuming working procedure on a monthly basis according to the operation cycle of the equipment after maintenance.

5.1.8 Calculation principles of waste heat utilization energy consumption

The waste heat recovered by the enterprise belongs to energy saving and recycling and does not

5.3.1 Calculation range of product energy consumption of crude metallic lithium enterprises

The calculation range of energy consumption for the production of crude metallic lithium products includes the various energy consumed in the entire production process starting from material transportation, through DC electrolysis to tail gas treatment, and the allocation of direct assistant energy consumption in the workshops and factories.

The unit object consumption in each working procedure of the crude metallic lithium production technology is calculated according to Formula (3); the unit energy consumption in each working procedure of the electrolysis production technology is calculated according to Formula (4); and unit consumption of integrate energy of the crude metallic lithium production technology is calculated according to Formula (6).

5.3.2 Calculation range of energy consumption of products of industrial-level metallic lithium enterprises

The product energy consumption calculation of industrial-level metallic lithium production technology includes the energy consumption of crude metallic lithium products and the energy consumption of industrial-level metallic lithium purification; all kinds of energy consumed during the energy consumption of industrial-level metallic lithium purification starting from melting and casting, to extrusion, shearing and packaging in the drying room to complete the entire process; as well as the allocation of direct assistant energy consumption within workshops and factories.

The unit object consumption in each working procedure of the industrial-level metallic lithium production technology is calculated according to Formula (3); the unit energy consumption in each working procedure of the industrial-level metallic lithium production technology is calculated according to Formula (4); and the unit consumption of integrate energy of the industrial-level metallic lithium production technology is calculated according to Formula (6).

5.3.3 Calculation range of the product energy consumption of battery-level metallic lithium enterprise

The product energy consumption of battery-level metallic lithium production technology includes the energy consumption of crude lithium products and the energy consumption of battery-level metallic lithium purification. The energy consumption of battery-level metallic lithium purification includes all kinds of energies consumed in melting, steaming, ingot casting, shearing and packaging to complete the entire production process, and the direct assistant energy loss allocation in the workshops and factories.

The unit object consumption in each working procedure of the battery-level metallic lithium production technology is calculated according to Formula (3); the unit energy consumption in each working procedure of the battery-level metallic lithium production technology is calculated according to Formula (4); and the unit consumption of integrate energy of the battery-level metallic lithium production technology is calculated according to Formula (6).

6 Energy Saving Management and Measures

6.1 Basic energy-saving management

6.1.1 Enterprises shall establish an energy-saving assessment system, regularly assess the energy consumption in each working procedure of lithium smelting enterprises, and break down the assessment indicators to each grassroots unit.

6.1.2 Enterprises shall establish an energy consumption statistics system in accordance with regulations; establish documents and files of energy consumption calculations and statistical results; and 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 provisions of GB 17167.

6.2 Energy-saving technology management

6.2.1 Lithium smelting and production enterprises shall rely on scientific and technological progress; select advanced production technology and carry out technological transformation; strengthen internal management of the enterprise; improve production efficiency and energy utilization; and save energy to the maximum extent.

6.2.2 Lithium smelting and production enterprises shall organize production reasonably; reduce intermediate links; improve production capacity; and extend the life cycle.

6.2.3 Lithium smelting and production enterprises shall vigorously develop circular economy and improve the level of comprehensive utilization of resources.

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