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The Norm of Energy Consumption per Unit Product of Sponge Titanium

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1 Application Scope

This Standard specifies the specifications, calculation principle and calculation method, and energy-saving management and measures of the norm of energy consumption per unit product of sponge titanium (hereinafter referred to as energy consumption).

This Standard applies to the calculation, evaluation and assessment of products' energy consumption of the manufacturer who manufacture sponge titanium using the magnesium thermal reduction process (the Kroll method).

2 Normative References

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

GB/T 2589, *General Principles for Calculation of the Comprehensive Energy Consumption*

GB/T 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 Standard, the following terms and definitions and those defined in GB/T 2589 apply.

3.1

primary energy sources

Coal, natural gas, crude oil and other energy sources.

3.2

secondary energy sources

Coke, fuel oil, petroleum coke, coal gas, electric power, petroleum products (gasoline, diesel and kerosene), heating power and other energy species specified by the national statistical system.

3.3

Energy consumption medium

The operation material which is consumed during the production process and is not used as a raw material nor incorporated in products, and whose production or preparation requires direct energy consumption.

3.4

unit energy consumption in working procedure

The energy consumed by per unit qualified product during the manufacturing process of the manufacturer.

3.5

unit object consumption in working procedure

The quantity of material object of some energy source consumed by per unit qualified product of the manufacturer in the manufacturing process.

3.6

unit energy consumption of technology

The ratio of the energy consumed by all manufacturing procedures for the production of some product to the quantity of qualified products manufactured during the statistical reporting period.

3.7

assistant energy consumption

The ratio of the energy consumed by the assistant manufacturing system to the quantity of qualified products manufactured during the statistical reporting period.

3.8

enterprise integrated energy consumption

The total of unit energy consumption of technology, assistant energy consumption and loss allocation.

competent department; when the energy sources are outsourced, their energy calorific shall be the same; when the energy calorific value is not specified, it may be converted in accordance with the conversion coefficient of the national statistical department. See Annex B. The waste heat recovered by the manufacture is subjected to the conversion coefficient for heating power; and all waste heat power generation is subjected to the conversion coefficient for electric power.

5.4 Determination of qualified product quantity

The qualified product quantity in the titanium slag procedure is the total of qualified titanium slag manufactured during the same statistical reporting period;

The qualified product quantity in the chlorination procedure is the total of qualified crude titanium tetrachloride manufactured during the same statistical reporting period;

The qualified product quantity in the refining procedure is the total of qualified refined titanium tetrachloride manufactured during the same statistical reporting period;

The qualified product quantity in the magnesium electrolysis is the total of qualified magnesium manufactured by electrolyzing magnesium chloride during the same statistical reporting period;

The qualified product quantity in the procedures of reduction-distillation and crushing is the total of qualified sponge titanium manufactured during the same statistical reporting period.

5.5 Statistical caliber of energy consumption in working procedure

The energy consumption in the titanium slag procedure includes the energy consumption in the whole process including ilmenite burdening, electric furnace smelting and crushing.

The energy consumption in the chlorination procedure includes the energy consumption in the whole process including burdening, chlorine supply and titanium slag chlorination.

The energy consumption in the refining procedure include the energy consumption in the whole process of crude titanium tetrachloride refining.

The magnesium electrolysis procedure includes the electrolysis of magnesium chloride and refining of crude magnesium; and the process products include magnesium and chlorine. The energy consumption in anode fabrication, magnesium chloride treatment and tail gas treatment are reckoned in the energy consumption in the magnesium electrolysis procedure; and the energy consumption in the chlorine recovery and delivery system is reckoned in the energy consumption of the chlorination procedure.

The energy consumption in the reduction-distillation procedure include the energy consumption in the whole process including equipment preparation, reduction and distillation, and product removal.

$$Z=\frac{E_z+F+S}{p} \qquad \text{(3)}$$

where,

Z--the integrated energy consumption of a technology during the statistical reporting period;

E_z--the total energy consumption in working procedure of a technology during the statistical reporting period;

F--the assistant energy consumption of a technology during the statistical reporting period;

S-- the energy loss of a technology during the statistical reporting period;

p--the quantity of qualified product of a technology during the statistical reporting period.

7 Energy-saving Management and Measures

7.1 Energy-saving basic management

7.1.1 The manufacturer shall provide and use corresponding energy measurement instruments and establish an energy measurement management system as specified in GB 17167.

7.1.2 Enhance the basic measurement work of energy to ensure the accuracy of energy measurement.

7.1.3 Make the criteria of assessment and carry out energy consumption assessments.

7.2 Energy-saving measures

7.2.1 Carry out scientific energy-saving management and share energy-saving technologies.

7.2.2 Carry forward the scale development of equipment and promote the application of new processes, new technologies and new equipment for energy saving.

7.2.3 Enhance the cyclic utilization and recycling of energy.

7.2.4 Enhance the heat insulation and sealing of industrial furnaces and reduce heat energy loss.

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