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NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

ICS 27.010

F 01

GB/T 2589-2020

Replacing GB/T 2589-2008

**General Rules for Calculation of the Comprehensive
Energy Consumption**

综合能耗计算通则

Issued on: September 29, 2020

Implemented on: April 01, 2021

**Issued by: State Administration for Market Regulation;
Standardization Administration of PRC.**

Table of Contents

Foreword.....	3
1 Scope.....	4
2 Normative References	4
3 Terms and Definitions	4
4 Calculation Principles.....	6
5 Boundary Division	7
6 Calculation Range.....	8
7 Calculation Methods	8
8 Requirements for Conversion to Standard Coal.....	10
Appendix A (Informative) Standard Coal Coefficient of Various Energies (Reference Value).....	11
Appendix B (Informative) Standard Coal Coefficient of Main Energy-Consumed Medium (by Energy Source Equivalent Value) (Reference Value)	13

General Rules for Calculation of the Comprehensive Energy Consumption

1 Scope

This Standard specifies the calculation principles, boundary division, calculation range, calculation method, and requirements for conversion to standard coal of the comprehensive energy consumption.

This Standard is applicable to the calculation of energy consumption indicators for energy consumption unit (including secondary energy consumption unit or their components).

2 Normative References

The following documents are essential to the application of 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 3102.4 Quantities and Units - Heat

GB/T 3484 The General Principles for Energy Balance of Industrial Enterprise

GB 17167 General Principle for Equipping and Managing of the Measuring Instrument of Energy in Organization of Energy Using

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

3 Terms and Definitions

For the purpose of this document, the following terms and definitions apply.

3.1 Energy-consumed medium

The working substance that is consumed in the production process, but not used as a

NOTE 2: For energy consumption unit that takes raw material processing and other operations as the energy consumption assessment object, the concept of comprehensive energy consumption for unit operation capacity is also included in this definition.

NOTE 3: According to different product output (operation capacity, workload, service capacity) dimensions, the unit of comprehensive energy consumption for unit output of product may include: kgce/kg, kgce/m³, etc.

3.8 Comparable comprehensive energy consumption for unit output of product

In order to achieve comprehensive energy consumption for unit output of product comparable among the same product in the same industry, the comprehensive energy consumption for unit output of product that is calculated by revising the main factors affecting product energy consumption.

NOTE: According to different product output (operation capacity, workload, service capacity) dimensions, the unit of comparable comprehensive energy consumption for unit output of product may include: kgce/kg, and kgce/m³, etc.

3.9 Standard coal coefficient

The quantity of standard coal that is converted by the physical quantity of energy unit or the physical quantity of energy consumed by producing the unit energy-consumed medium.

NOTE: According to the different physical quantities of energy, the unit of the standard coal coefficient may include: kgce/kg, kgce/m³, [(kgce/(kW·h))], and kgce/MJ, etc.

4 Calculation Principles

4.1 Compliance. The types of energy included in the calculation of comprehensive energy consumption shall meet the requirements of national energy statistics.

4.2 Completeness. The calculation of comprehensive energy consumption shall include all energy and energy-consuming medium actually consumed in the production process; and shall not be omitted or recalculated.

4.3 Accuracy. The calculation of comprehensive energy consumption shall accurately reflect the true, measurable and verifiable energy consumption of the energy consumption unit.

4.4 Consistency. When calculating the comprehensive energy consumption during the statistical reporting period, the boundary division and calculation methods shall be consistent.

5.4 If the energy-consuming units are located in two or more secondary energy consumption units or their components in different geographical locations, then multiple boundaries may be delineated as needed to facilitate the calculation of comprehensive energy consumption by energy consumption units.

6 Calculation Range

6.1 The calculation range of comprehensive energy consumption includes the actual consumption of various energy such as primary energy and secondary energy; includes the energy used as raw materials. The actual consumption of various energy may be calculated in accordance with GB/T 3484, GB/T 28749, GB/T 28751, etc.

6.2 The energy consumed by the energy-consumed medium shall be included in the calculation of comprehensive energy consumption. Energy-consumed medium mainly include fresh water, softened water, compressed air, oxygen, and nitrogen, etc.

6.3 The loss of energy and energy-consumed medium in the process of internal storage, conversion, and distribution (including export) of energy consumption unit shall be included in the comprehensive energy consumption.

6.4 The raw data that can be used to calculate the comprehensive energy consumption include the reading records of energy measuring instruments, the data records of the online energy consumption monitoring system, the energy statistics reports, the invoices, and the energy bills, etc. The equipment of energy measuring instruments shall meet the requirements of GB 17167.

7 Calculation Methods

7.1 The comprehensive energy consumption is calculated according to Formula (1):

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

Where:

E – comprehensive energy consumption;

n – the number of the consumed energy types;

E_i – the actually consumed quantity of the i^{th} energy (including the quantity of energy consumed by the energy-consumed medium) during the production and/or service activities;

k_i – the standard coal coefficient of the i^{th} energy.

NOTE: The comparable comprehensive energy consumption for unit output of product is mainly used to investigate the energy efficiency or energy intensity of the energy consumption unit.

8 Requirements for Conversion to Standard Coal

8.1 When calculating the comprehensive energy consumption, various energy sources shall be converted into standard coal.

8.2 The actual fuel energy consumption shall be converted into standard coal quantity based on the calculation basis of its received base low calorific value. Convert according to international table calorie specified in GB/T3102.4, the fuel whose low calorific value is equal to 29307.6 kilojoules (kJ) [7000 kilocalories (kcal)] is called 1 kilogram of standard coal (1kgce).

NOTE: According to the calory at 20°C, the low calorific value of 1 kg of standard coal (1kgce) is equal to 29271.2 kilojoules (kJ). According to the calory at 15°C, the low calorific value of 1 kg of standard coal (1kgce) is equal to 29298.5 kilojoules (kJ).

8.3 The low calorific value of energy and the energy consumption of energy-consumed medium shall be converted into standard coal according to the actual measured value or the data provided by the supplier. If the actual measured value cannot be obtained, the standard coal coefficient may refer to the data published by the National Bureau of Statistics or refer to Appendixes A and B. For self-produced secondary energy, its standard coal coefficient shall be calculated and determined based on actual input and output.

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