

JB

**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

JB/T 4088.1-2022

Replacing JB/T 4088-2012

**Tubular electric heating elements for household use - Part 1:
General requirements**

日用管状电热元件 第1部分：通用要求
(English Translation)

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1 Scope

This Document specifies the terms and definitions, classification, technical parameters, model naming, technical requirements, test methods, inspection rules, as well as marks, packaging, transportation and storage for daily-use metallic tube electric heating elements.

This Document applies to the manufacture of daily-use metallic tube electric heating elements installed in household appliances, with a rated voltage not exceeding 480 V and a single tube rated power not exceeding 9000 W.

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 1804-2000, General Tolerances -- Tolerances for Linear and Angular Dimensions without Individual Tolerance Indications

GB 4706.1-2005, Household and Similar Electrical Appliances -- Safety -- Part 1. General Requirements

GB 4706.12-2006, Safety of household and similar electrical appliances -- Particular requirements for storage water heaters

GB/T 17196-2017, Connecting devices -- Flat quick-connect terminations for electrical copper conductors -- Safety requirements

JB/T 12719-2016, Test method of accelerated life of daily-use metallic tube electric heating elements

3 Terms and definitions

For the purposes of this Document, the following terms and definitions apply.

3.18 Electrician magnesium oxide

Magnesium oxide blocks, after being crushed and mixed in a certain proportion with different particle sizes (mesh count), are used directly or after modification in elements as an insulating medium for heat conduction at high temperatures. hereinafter referred to as "magnesium oxide".

3.19 Flow rate

The time required for 100 g of magnesium oxide to pass naturally through the orifice of a standard funnel. The unit is seconds per 100 grams (s/100 g).

4.1.1.1 Used for heating liquids

The effective heating surface of the element is directly immersed in the liquid, and is in direct and/or through fins contact with the liquid. During normal operation, the liquid is the primary heating medium.

The liquid medium can be still or flowing water, aqueous solution, ethanol, edible or non-edible oil, etc.

4.1.1.2 Used for heating gas

The element is in direct and/or through fins contact with the gas. During normal operation, the gas is the primary heating medium.

The gaseous medium is stationary or flowing air or other gases.

4.1.1.3 Used for heating metal

The element is cast, embedded, or pressed into a metal material, with the heating surface in full or partial contact with the metal material. During normal operation, the metal material is the primary heating medium, used to heat liquids and/or solids but without direct contact with the liquids and/or solids.

The metallic medium is made of metals such as aluminum, copper, and steel.

4.1.1.4 Used for heating other substances

The element is used for heating other substances.

4.1.2 Classification by the cross-sectional shape of the external nozzle

4.1.2.1

The cross-section is circular.

4.1.2.2

The cross-section is irregular (rectangular, triangular, or other non-circular cross-sections).

4.2 Technical parameters

4.2.1

Main technical parameters and units involved in the elements.

- a) Power supply voltage, in volts (V);
- b) Power supply frequency, in hertz (Hz);
- c) Rated voltage, in volts (V);
- d) Rated power, in watts (W);
- e) Working temperature, in K (K) or degrees Celsius (°C);
- f) Outer diameter, in millimeters (mm);
- g) Unfolding length, in millimeters (mm);
- h) External dimensions, in millimeters (mm);
- i) Mass, in kilograms (kg);
- j) Heating medium;
- k) Water pressure (if applicable), in megapascals (MPa).

4.2.2

Calculation methods for some technical parameters.

- a) Surface effective load. in watts per square centimeter (W/cm²). Formula for calculating the surface effective load.

Surface effective load = power value of the element / effective heating surface area of the element

- b) Equivalent resistance. in ohms (ohm). Formula for calculating the equivalent resistance.

Where, $R(T)$ - Equivalent resistance of the element at working temperature T , in ohms (ohm); R_0 - Cold resistance of the element, in ohms (ohm); α - Temperature coefficient of resistance, in Kelvin (K⁻¹); T - Working temperature of the element, in Kelvin (K);

T_0 - Temperature of the element in its cold state, in Kelvin (K).

4.3 Model naming

Element model naming shall preferably follow the rules specified in Annex A. It may be named by the manufacturer. Self-named model shall, as far as possible, reflect the