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

GB/T 13465.12-2023

**Test method of impermeable graphite materials - Part
12: Thermal conductivity**

不透性石墨材料试验方法 第12部分：导热系数

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Foreword

This document complies with the provisions of GB/T 1:1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents" Drafting: This document is Part 12 of GB/T 13465: GB/T 13465 has released the following parts:

---Test Methods for Impermeable Graphite Materials Part 1: General Principles of Mechanical Properties Test Methods;

---Test methods for impermeable graphite materials Part 2: Flexural strength;

---Test methods for impermeable graphite materials Part 3: Compressive strength;

---Test methods for impermeable graphite materials Part 4: Impact strength;

---Test method for shrinkage of impermeable graphite phenolic adhesive;

---Water pressure burst test method for impermeable graphite tubes;

---Test method for weight gain rate and porosity filling rate of impermeable graphite;

---Test method for bonding shear strength of impermeable graphite adhesive;

---Test method for tensile strength of impermeable graphite adhesive;

---Test methods for impermeable graphite materials Part 12: Thermal conductivity: Please note that some content in this document may be subject to patents: The publisher of this document assumes no responsibility for identifying patents: This document is proposed by China Petroleum and Chemical Industry Federation: This document is under the jurisdiction of the National Technical Committee for Standardization of Non-Metallic Chemical Equipment (SAC/TC162): This document was drafted by: Nantong Shanjian Anti-corrosion Technology Co., Ltd., Nantong Planet Graphite Co., Ltd., Guangzhou Special Pressure

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GB/T 13465 aims to accurately measure the mechanical properties, permeability and thermal conductivity of impermeable graphite materials used in chemical production: It is proposed to be Composed of 12 parts:

---Part 1: General principles: The purpose is to provide basic requirements and principles for performance testing of impermeable graphite materials:

---Part 2: Flexural strength: The purpose is to determine the flexural strength of impermeable graphite materials:

1 Scope

GB/T 13465.12-2023 is the Chinese national standard on test method of impermeable graphite materials - part 12:thermal conductivity, in the field of chemical technology. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 27 November 2023 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 June 2024. Classification: ICS 71.120, CCS G94. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes a method for measuring the thermal conductivity of impermeable graphite materials: This document is suitable for measuring the thermal conductivity of impermeable graphite materials at room temperature between 20°C and 40°C using the comparative method: This document is applicable to the measurement of thermal conductivity of impermeable graphite materials with thermal conductivity less than or equal to 250W/(m·K):

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document

through normative references in the text: Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document:

HG/T 2370 Technical conditions for chemical equipment made of impermeable graphite

3 Terms and definitions

There are no terms or definitions to be defined in this document:

4 Principles

Fix the standard sample with known thermal conductivity between two measuring heads with set temperature (see Figure 1), so that the two ends of the sample are in contact with the measuring head end: The measuring head is divided into a heating end (hereinafter referred to as "hot end") and a cooling end (hereinafter referred to as "cold end"): The set temperature of the hot end is $40^{\circ}\text{C}\pm 0.1^{\circ}\text{C}$, the cold end set temperature is $20^{\circ}\text{C}\pm 0.1^{\circ}\text{C}$: The temperature at both ends of the head to be measured is stable at the set temperature, and the voltage value at the hot end is within When it remains unchanged for more than 10 minutes, record the heating voltage value of the hot end: By measuring standard tests of the same material, same diameter, and different heights sample, draw the U - λ - h curve (see Figure 2), where U is the hot end voltage value, in mV; λ is the thermal conductivity of the standard sample, in unit $\text{W}/(\text{m}\cdot\text{K})$; h is the height of the standard sample, in mm: Then, use the test sample instead of the standard sample for testing, and the head temperature to be measured When the temperature is stable at $40^{\circ}\text{C}\pm 0.1^{\circ}\text{C}$ and $20^{\circ}\text{C}\pm 0.1^{\circ}\text{C}$ respectively, record the heating voltage value of the hot end, and then, with the help of the drawn U - λ - h curve Figure, Calculate the thermal conductivity of the test specimen: The thermal conductivity of the standard sample material should be similar to the thermal conductivity of the tested sample material:

5 Test equipment and materials

1 Test device The schematic diagram of the thermal conductivity measurement device is shown in Figure 1: