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

GB/T 11142-2025

**Determination for gassing properties of insulating oil under
electrical stress and ionization**

绝缘油在电场和电离作用下析气性测定法

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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 supersedes GB/T 11142-1989 "Determination of Gas Emission Properties of Insulating Oil under Electric Field and Ionization", and is consistent with GB/T 11142- Compared to 1989, aside from structural adjustments and editorial changes, the main technical changes are as follows:

- The scope has been changed (see Chapter 1, Chapter 1 of the 1989 edition);
- The specifications for the gas measuring tube have been changed (see 4.1.4, 4.1.1.3 of the 1989 edition);
- Increased the temperature control accuracy requirements for heating devices (see 4.2, 4.1.2 of the 1989 edition);
- The specifications for syringes have been changed (see 4.6, 4.1.6 of the 1989 edition);
- The cleaning solvent has been changed (see 5, 6.1, 6.2; Chapter 5, 6.1, 6.2 of the 1989 edition);

---Sampling requirements have been added (see 7);
---The hydrogen flow rate has been changed (see 8.4,
7.4 in the 1989 edition);

1 Scope

GB/T 11142-2025 is the Chinese national standard on determination for gassing properties of insulating oil under electrical stress and ionization, in the field of electrical engineering. 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 5 October 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 May 2026. Classification: ICS 29.040, CCS E38. 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 the determination of the electric field strength sufficient to induce discharge at the oil-gas interface when insulating oil is subjected to a gas evolution cell of a specific geometry. A method of releasing or absorbing gas under (or ionization) action. This document applies to the testing of gas evolution properties of mineral insulating oils, natural ester insulating oils, synthetic ester insulating oils, and silicone-based insulating oils.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 1220-2007 Stainless Steel Bars

GB/T 7597 Sampling Method for Oils Used in Power Generation (Transformer Oil, Turbine Oil)

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Gas evolution properties When insulating oil is subjected to an electric field or ionization strong enough to cause a discharge at the oil-gas interface, the oil itself exhibits the behavior of absorbing or releasing gas. The body's capabilities.

4.1 Gas Analyzer

4.1.1 The gas analyzer consists of a gas analysis cell, a gas measuring tube, a hollow high-voltage electrode, etc., and its structure is shown in Figure 1.

4.1.2 The gas evolution cell is made of hard borosilicate glass. The part of the gas evolution cell subjected to the electric field consists of an inner diameter of $16\text{mm} \pm 0.2\text{mm}$ and an outer diameter of... It is made of a thin-walled glass tube with a diameter of $18\text{ mm} \pm$

0.2 mm (dimensions shown in Figure 2). The exterior of the gas evolution cell is coated with solvent-resistant silver paint as the external electrode (connected to...). The external electrode should have a grounding copper wire. A vertical slit should be made on the external electrode to observe the reaction of the oil surface.

4.1.3 The hollow high-voltage electrode is made of stainless steel bar with steel grade 06Cr19Ni10 conforming to GB/T 1220-2007, and the surface is polished. The hollow high-voltage electrode has an outer diameter of $10\text{mm} \pm 0.1\text{mm}$ (see Figure 2 for dimensions), and a stainless steel electrode with an outer diameter of 2mm and an inner diameter of 1mm is inserted inside. A steel capillary tube serves as the hydrogen channel. The electrode is supported by a precision-machined 24/29 tapered PTFE plug with a centrally drilled hole, ensuring alignment. The sealing of the conical PTFE plug in the center of the gas evolution cell should be checked after multiple uses. The hydrogen inlet pipe is located at the top of the hollow high-voltage electrode. A metal three-way stopcock is installed on the opening.

4.1.4 The gas measuring tube is a borosilicate glass U-shaped tube with an outer diameter of 7 mm and graduations (in mm), with a 14/25 tapered glass ground joint.