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

GB/T 47840-2026

**Test methods for compatibility of construction materials with
electrical insulating liquids**

电气绝缘液体与结构材料相容性试验方法

(English Translation)

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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 modified to adopt IEC 63177:2024 "Test methods for compatibility of electrical insulating liquids with structural materials".

The technical differences between this document and IEC 63177:2024, and the reasons therefor, are as follows.

---ISO 37 has been replaced by the normatively referenced GB/T 528 (see 6.5), and ISO 527-4 has been replaced by GB/T 1040.4 (see GB/T 1408.1 replaces IEC 60243.1 (see 6.5), and GB/T 2411 replaces ISO 868 (see 6.5).

GB/T 4074.5 replaces IEC 60851-5 (see 6.5), and GB/T 15022.2 replaces IEC 60455-2 (see 6.5).

Technical conditions;

---The normative reference GB/T 41633.2 (see 6.5) has been added to adapt to my country's technical conditions;

---IEC 60296:2020 (see 5.3.2) has been replaced by the normatively referenced GB 2536, and GB/T 21218 has been replaced by...

IEC 60836:2015 (see 5.3.2) and GB/T 41632 replaced IEC 61099 (see 5.3.2), and GB/T

44663 replaced...

IEC 63012:2019 (see 3.6, 3.7 and 5.3.2), NB/T 10199 replaces IEC 62770:2013 (see 3.3 and 5.3.2).

5.3.2) GB/T 21221 replaces IEC 60867 (see 5.3.3), and GB/T 41633.3 replaces IEC 62021-3:2014.

(See Chapter 2) and IEC 62021 (see 6.5), GB/T 5654 replaces IEC 60247 (see 6.5), GB/T 14542 replaces IEC 60422 (see 6.5) and NB/T 42140 replaced IEC 60814 (see 6.5), and NB/T 11730 replaced IEC 62961.

(See 6.5) to adapt to my country's technological conditions;

The following editorial changes have been made to this document.

---IEC 60050-151 has been replaced by informative reference documents GB/T 2900.95-2015 and GB/T 2900.16-2025.

GB/Z 16935.2-2013 replaced IEC 60664-2-1:2011, GB/T 11026.4, GB/T 11026.5, and IEC 60664-2-1:2011.

GB/T 11026.6 replaces IEC 60216-4; GB/T 39693.4 replaces ISO 48-4; and GB/T 1033.1 replaces...

ISO 1183.1 and GB/T 7759.2 replace ISO 815-2, and GB/T 11026.7 replaces IEC 60216-5 and GB/T 20112.

Replaced IEC 60505;

---The title of 5.3.4 has been changed to "Cooling liquid for liquid-cooled rotary electric motors (electric vehicle motors)".

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Electrical Equipment Industry Association.

This document is under the jurisdiction of the National Technical Committee on Standardization of Electrical Insulation Materials and Insulation Systems (SAC/TC301).

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Introduction

This document pertains to equipment such as liquid-immersed transformers, tap changers, liquid-immersed capacitors, and liquid-cooled rotary motors used in electric vehicles and oil pumps.

The manufacturer provides recommendations for screening suitable structural materials that meet the compatibility requirements of liquid and solid materials under different operating conditions.

In addition, tests are conducted after the liquid and structural materials are subjected to conditional treatment at a specified temperature.

Although mineral insulating oil-based finite structure materials have met industry needs, the emergence of new applications and liquid-filled electrical equipment...

The demand for higher flash points and better reliability has driven upgrades in requirements, thus necessitating the use of insulating liquids such as silicone oils, synthetic esters, and natural esters.

Performance evaluations were conducted on the electrical insulation system.

Meanwhile, driven by superior heat conduction performance, liquid-cooled rotary motors used in electric vehicles and oil pumps have also increased the contact strength of structural materials.

The possibility of contact with liquids. To avoid mechanical, electrical, and sealing failures in structural materials such as gasket materials, impregnating resins, and prefabricated components, this document...

Liquid-cooled rotary motors used in vehicles and oil pumps.

The evaluation procedures in this document focus on the chemical compatibility of structural materials and insulating fluids, but do not include long-term thermal performance or aging assessments.

Furthermore, this document does not specify threshold values for functional parameters of materials that depend on the specific application requirements.

Test methods for compatibility of electrical insulating liquids with structural materials

1 Scope

This document describes liquid-immersed transformers, tap changers, liquid-immersed capacitors, and liquid-cooled rotary transformers used in electric vehicles and oil pumps.

Test methods for the compatibility between electrical insulating liquids used in electrical equipment and structural materials.

This document applies to mineral insulating oils, natural esters, silicon insulating liquids, synthetic organic esters, modified esters, and capacitor liquids based on synthetic aromatics.

And liquids such as cooling fluid used in electric vehicles and oil pumps.

Note: Compatibility testing is insufficient to fully evaluate structural materials for a given application; other tests are required according to the requirements of the relevant technical committee or equipment manufacturer.

test.

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 528 Determination of tensile stress-strain properties of vulcanized rubber or thermoplastic rubber (GB/T 528-2009, ISO 37.

2005, IDT)

GB/T 1040.4 Determination of tensile properties of plastics - Part 4: Isotropic and orthotropic fiber-reinforced composites Test conditions (GB/T 1040.4-2006, ISO 527-4:1997, IDT) IEC 60243-1:2013, IDT GB/T 2411 Plastics and hard rubber - Determination of indentation hardness (Shore hardness) using a hardness tester (GB/T 2411-2008, ISO 868.

2003, IDT)

GB 2536 Unused mineral insulating oil for electrical fluid transformers and switches (GB 2536-2025, IEC 60296.

2020, MOD)