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

GB/T 41592-2022

**Mineral insulating oils - Methods for the determination of
2-furfural and related compounds**

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Table of Contents

- foreword
- 1 Scope
- 2 Normative references
- 3 Terms and Definitions
- 4 Method overview
- 5 Significance and use
- 6 Instruments
- 6.1 Liquid Chromatograph

foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules of Standardization Documents" drafted.

This document is modified and adopted IEC 61198.1993 "Mineral insulating oil 2-furfural and related components Determination method".

Compared with IEC 61198.1993, this document has more structural adjustments. This document and IEC 61198.1993 structure numbering changes

See Appendix A for a list of comparisons.

The technical differences between this document and IEC 61198.1993 and their reasons are as follows.

a) The "scope" of this document is rewritten in accordance with the requirements of GB/T 1.1-2020, and the second paragraph of IEC 61198.1993 "scope"

Adjusted to Chapter 4 "Summary of Methods" of this document;

b) IEC 567.1992 has been deleted from the normative reference document. Since Chapter 4 "Sample Labeling" has been deleted in this document, it is no longer necessary to cite it.

In addition to IEC 475.1974; because this document is changed to refer to GB/T 4756 and GB/T 7597;

c) According to the actual needs of our country, GB/T 4756, GB/T 6682, GB/T 7597 are added;

d) Added Chapter 3 "Terms and Definitions", Chapter 5 "Meaning and Use"; deleted

Chapter 4 "Sample Standard" of IEC 61198.1993

Note";

e) The order of the chapters "calibration" and "test steps" has been appropriately adjusted according to our country's arrangement habits.

Please note that some content of this document may be patented. The issuing agency of this document assumes no responsibility for identifying patents.

1 Scope

This document describes a method for the determination of 2-furfural and related components in insulating oils by high performance liquid chromatography.

This document applies to the detection of furfural and related components in used mineral insulating oils, as well as new mineral insulating oils.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, dated citations

documents, only the version corresponding to that date applies to this document; for undated references, the latest edition (including all amendments) applies to

this document.

GB/T 4756 Manual sampling method of petroleum liquids (GB/T 4756-2015, ISO 3170.2004, MOD)

GB/T 6682 Analysis Laboratory Water Specifications and Test Methods (GB/T 6682-2008, ISO 3696.1987, MOD)

GB/T 7597 Sampling method of power oil (transformer oil, turbine oil)

3 Terms and Definitions

There are no terms and definitions that need to be defined in this document.

4 Method overview

The furan derivatives in insulating oil were extracted by liquid-liquid extraction method (Method A) or silica gel column solid-phase extraction separation method (Method B).

The extract was then injected into a high performance liquid chromatograph (HPLC) for analysis.

5 Significance and use

5.1 The degradation of cellulosic materials in solid insulation of oil-filled electrical equipment will generate corresponding decomposition products, such as sugars and furan derivatives.

5.2 Furan derivatives, most of which are adsorbed on insulating paper in electrical equipment, are only slightly soluble in oil. Its presence can be used as a test for equipment in use

See additional information on basis and dissolved gas analysis.

6.1.1 Pumping system. capable of delivering (or using) at least two solvents.

6.1.2 Sampling equipment. suitable for injecting 10 μL ~ 20 μL , and a suitable precision syringe (capacity 50 μL ~ 250 μL).