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

GB/T 24624-2009

**Insulated bushings -- Guide for the interpretation of dissolved
gas analysis (DGA) in bushings where oil is the impregnating
medium of the main insulation (Generally paper)**

绝缘套管 油为主绝缘（通常为纸）浸渍介质套管中溶解气体分析（DGA）的判断
导则

(English Translation)

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Foreword

This revised standard adopts IEC 61464:1998 "bushing oil-based insulation (usually paper), impregnated with dissolved gas partial dielectric sleeve Analysis (DGA) judgment Guidelines "and its Amendment 1 (2003) (in English).

Amendment of the content has been incorporated in the text and in terms of which they are involved in the margin in double vertical (||) logo.

This standard and IEC 61464:1998 as compared to made the following modifications, at a single vertical line (|) in which they are involved reg page Margin identified.

--- According to domestic practice test transformer oil in Table 1. Added Note. transformer oil in storage, during transport, or in certain Under special conditions may also produce a very small amount of acetylene, are not due to the fault characteristics.

--- Referenced international standards national standards.

For ease of use, this standard made the following editorial changes.

a) instead of as a decimal by decimal comma ", ". ";

The term b) "The technical report" to the "standard";

c) Remove IEC 61464:1998 Foreword.

This standard reg number and IEC 61464:1998 exactly.

Appendix A of this standard is an informative annex.

The standard proposed by China Electrical Equipment Industrial Association.

This standard by the National Standardization Technical Committee Insulators (SAC/TC80) centralized.

This standard was drafted. Xi'an Ceramic Institute, Xi'an High Voltage Apparatus Research Institute Co., Ltd., Nanjing Electric (Group) Co., Ltd.

National Insulator arrester Quality Supervision and Inspection Center, Nanjing Tyrone Special Ceramics Co., Ltd., Zhejiang Electric Power Test and Research Institute.

Introduction

In the oil-filled paper casing and oil casing, the gas will be for the following reasons.

--- Manufacturing process;

--- Normal aging;

By --- most cases, heat and (or) defects can cause electrical overstress development.

The value of early detection of potential failure is to prevent the sleeve and the equipment connected to serious damage.

Defect is not serious, the generated gas is usually dissolved in oil, of which a small portion of the oil phase diffusion from the final out and formed on the surface into the respective gas phases. Extract dissolved gases from the oil sample and determine the composition and quantity of the gas as a means of detecting such defects, and any the type and severity of defects are often able to speed from its component gases generated by inference.

Dissolved Gas Analysis (DGA) is an oil-filled equipment in certain types of defect detection technology, and these defects using traditional methods may not Easily detectable. This can sometimes be a source of equipment or system operation and abnormalities of valuable information.

If the presence of.

--- Local overheating;

--- Partial discharge and (or);

--- Arc discharge.

Oil and solid insulation will form gaseous decomposition products of these decomposition having its characteristic components. Depending on the basic gas component Containing material, and the temperatures reached and the energy of these materials to decompose.

DGA judgment rule oil-filled power transformers and other electrical equipment See IEC 60599:1999.

Immersion oil casing due to oil and paper is different from the ratio of the transformer, and therefore can not be directly applied IEC 60599:1999.

The importance of the casing DGA technology is the development of this standard motivation.

In addition to DGA results to determine the outside, due to the particular requirements, but also gives the oil extracted from oil-filled paper sleeve and oil sample program as described in Appendix A said.

This standard describes how to use the content of dissolved gas to diagnose condition of the casing, IEC is running for more than 35 years, more than 500 casing the results of statistical analysis. These sleeves belong to eight different manufacturers, and there is no reason to suspect that there is an abnormality in the operation.

In addition to the gas content, the ratio of the content of some of the gas can be used to diagnose condition of the casing. The recommended ratio derived from simulation and partial discharge Laboratory model test results of hot spots.

DGA's role in the early detection of potential failures oil impregnated paper sleeve, in order to avoid damage to the casing. DGA is able to detect certain types of Potential failure and electrical performance test is not easy to detect faults. Dissolved gas analysis is a method of evaluation of the status of the sleeve, a further letter Application of interest electrical performance test for detection, such as capacitance, tgdelta, partial discharge measurement, such as support for diagnosis.

Oil extracted from the sample gas chromatographic analysis and laboratory technology 60567 in IEC .1992 is given.

Bushings oil-based insulation (usually paper) Impregnated bushing media Dissolved Gas Analysis (DGA) judgment Guide

1 Scope

This standard specifies the dissolved gas analysis (DGA) determine guidelines specifically for the cannula, the main insulation sleeve (usually Paper) comply with the IEC 60296:2003 Mineral oil-impregnated.

This standard applies to oil and oil-filled paper casing used.

Before making further experience, the method used should be consistent with GB/T 21221-2007 prudence other materials, such as dodecyl Benzene-based synthetic hydrocarbons.

Analyzing the results of oil samples extracted from the cannula and dissolved gas analysis should be considered as guidance information, along with any measures taken should be After proper evaluation of the project.

2 Normative references

The following documents contain provisions which, through reference in this standard and become the standard terms. For dated references, subsequent Amendments (not including

errata content) or revisions do not apply to this standard, however, encourage the parties to the agreement are based on research Whether the latest versions of these documents. For undated reference documents, the latest versions apply to this standard.

GB/T 4109-2008 AC voltage greater than 1000V insulating sleeve (IEC 60137:2008, MOD)
 GB/T 21221-2007 insulating liquid based on synthetic aromatic hydrocarbons unused
 insulating liquids (IEC 60867:1993, MOD) IEC 60296:2003 for electrical insulation fluid for
 transformers and switchgear equipment unused mineral insulating oils IEC 60567:1992
 oil-filled electrical equipment like gas and oil extraction and analysis of free and dissolved
 gases guidelines Analyzing guide 1999 running mineral oil immersion Appliances dissolved
 and free gas analysis are. IEC 60599

3.1 Oil and gas produced by the decomposition of paper

Normal operation, the conductor loss and electrical stress so that decomposition gas oil and paper, even if the temperature is not too high, thermal decomposition of the oil, and the paper will produce gas. Under normal operating conditions, oil is produced by the decomposition of hydrogen gas (H_2), methane (CH_4), ethane (C_2H_6) and ethylene (C_2H_4), and fiber Dimensional material decomposition gases is carbon monoxide (CO) and carbon dioxide (CO_2).

Mainly due to an abnormal operation of the gas within the sleeve is heat and electricity failure.

Under fault conditions, the content of the gas is higher than the normal operating state, and there will be acetylene (C_2H_2) gases.

With the development of the fault, the content of unsaturated hydrocarbons (mainly C_2H_4 and C_2H_2) increases.

Fibrous material, the key fault gases produced are carbon monoxide (CO) and carbon dioxide (CO_2), along with the development of thermal fault, CO and CO_2 content increases.

Diagnosis is based on the state of the casing in normal aging and a variety of fault conditions, oil and paper type and content of decomposition gases produced, and this the ratio of these gas content.

Gas generated can be expressed as the critical characteristic which defines a gas, its failure will occur and the sleeve are summarized in Table 1. classified.

Table 1 shows the analysis of hydrocarbon gas is dissolved in the most commonly used. Three-carbon and four-carbon hydrocarbons are also formed but not listed

Into this standard.