



Examination Standard for Dissolved Gas Analysis Monitoring Systems in Liquid-Immersed Transformers

Class Number 6520

February 2022

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Foreword

This standard is intended to verify that the products and services described will meet stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of a this standard is to present the criteria for examination of various types of products and services.

Examination in accordance with this standard shall demonstrate compliance and verify that quality control in manufacturing shall ensure a consistent and reliable product.

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1 INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states testing and certification requirements for Hydrogen Dissolved Gas Analysis (DGA) continuous monitoring systems, for the detection of gas formation in liquid-immersed transformers.
- 1.1.2 Testing and certification criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility(ies), audit of quality assurance procedures, and a surveillance program.

1.2 Scope

- 1.2.1 This standard applies to any component or system intended for or for use in Hydrogen DGA monitoring within liquid-immersed transformers.
- 1.2.2 This standard contains requirements for DGA monitoring systems in liquid-immersed transformers. The liquid is typically mineral oil, natural ester oil, synthetic ester oil, or silicone oil. Other liquids shall require special investigation.
- 1.2.3 This standard does not apply to gas detecting equipment monitoring headspace within a sealed liquid-immersed transformer.

1.3 Basis for Requirements

- 1.3.1 The requirements of this standard are based on research, testing, and/or the standards of other organizations. The advice of manufacturers, users, trade associations, jurisdictions and/or loss control specialists was also considered.
- 1.3.2 The requirements of this standard reflect tests and practices used to examine performance characteristics for Hydrogen DGA monitoring systems for the purpose of obtaining certification. Systems having characteristics not anticipated by this standard may be certified if system performance is equal or superior to that required by this standard. Systems which meet all requirements identified in this standard shall not be certified if other conditions exist which adversely affect performance or intent of this standard.

1.4 Basis for Certification

Certification is based upon satisfactory evaluation of the product and manufacturer in the following areas:

- 1.4.1 Examination and tests on production samples shall be performed to evaluate
 - the suitability of the product;
 - the performance of the product as specified by the manufacturer and required for certification; and as far as practical,
 - the durability and reliability of the product.
- 1.4.2 An examination of the manufacturing facilities and audit of quality control procedures may be made to evaluate the manufacturer's ability to consistently produce the product which is examined and tested, and the marking procedures used to identify the product. Subsequent surveillance may be required by the certification agency in accordance with the certification scheme to ensure ongoing compliance.

1.5 Basis for Continued Certification

- 1.5.1 The basis for continual certification may include, but is not limited to, the following based upon the certification scheme and requirements of the certification agency:
- production or availability of the product as currently certified;
 - the continued use of acceptable quality assurance procedures;
 - satisfactory field experience;
 - compliance with the terms stipulated by the certification;
 - satisfactory re-examination of production samples for continued conformity to requirements; and
 - satisfactory surveillance audits conducted as part of the certification agencies product surveillance program.

1.6 Effective Date

- 1.6.1 The effective date of this certification standard mandates that all products tested for certification after the effective date shall satisfy the requirements of this standard.
- 1.6.2 The effective date of this standard is eighteen (18) months after the publication date of the standard for compliance with all requirements.

1.7 System of Units

- 1.7.1 Units of measurement used in this Standard are United States (U.S.) customary units. These are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. The first value stated shall be regarded as the requirement. The converted equivalent value may be approximate. Conversion of U.S. customary units is in accordance with ANSI/IEEE/ASTM SI 10.

1.8 Normative References

- 1.8.1 The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the cited edition applies.

ANSI/IEC 60529, *Degrees of Protection Provided by Enclosures (IP Code)*.

ANSI/IEEE/ASTM SI 10, *American National Standard for Metric Practice*

ANSI/UL 61010-1, *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements*

ASTM D923, *Standard Practices for Sampling Electrical Insulating Liquids*

ASTM D3487, *Standard Specification for Mineral Insulating Oil Used in Electrical Apparatus*

IEC 60068-2-6, *Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)*

IEC 61326-1, *Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements*

ISO 6142 - *Gas analysis – Preparation of calibration gas mixtures – Gravimetric method*