



Examination Standard for Toxic Gas and Oxygen Depletion Detectors

Class Number 6340

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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 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.

TABLE OF CONTENTS

1 INTRODUCTION.....	1
1.1 Purpose	1
1.2 Scope	1
1.3 Basis for Requirements	2
1.4 Basis for Certification.....	2
1.5 Basis for Continued Certification	2
1.6 Effective Date	3
1.7 System of Units.....	3
1.8 Normative References	3
1.9 Definitions.....	3
2 GENERAL INFORMATION	4
2.1 Certification Application Requirements.....	4
2.2 Requirements for Samples for Examination	4
3 GENERAL REQUIREMENTS	5
3.1 Review of Documentation.....	5
3.2 Markings.....	5
3.3 Manufacturer's Installation and Operation Instructions.....	7
3.4 Test Apparatus	8
3.5 Test Gas Concentration	9
3.6 Calibration.....	9
4 CONSTRUCTION REQUIREMENTS.....	10
4.1 General	10
5 PERFORMANCE REQUIREMENTS.....	11
5.1 General	11
5.2 Test Methods.....	12
6 OPERATIONS REQUIREMENTS	14
6.1 Demonstrated Quality Control Program.....	14
6.2 Surveillance Audit	14
6.3 Installation Inspections.....	15
6.4 Manufacturer's Responsibilities	15

1 INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states testing and certification requirements for toxic gas and oxygen depletion gas detection instruments.
- 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 sets performance requirements for the construction and testing of toxic gas and oxygen depletion gas detection instruments. Instruments used to detect flammable (explosive) concentrations of toxic gas(es) when the LFL exceeds the TLV are excluded.
- 1.2.2 For apparatus used for sensing the presence of multiple gases that are both toxic and flammable, this document applies only to the portion sensing the presence of toxic gas or vapor.

Note: Some gases may be both toxic and flammable, and even though the concentrations required to reach the flammable limit are typically many times greater than the toxic levels, consideration of the gas detector method of protection for hazardous locations should be made when using toxic gas detectors in locations where flammable gases may be present.

- 1.2.3 This standard does not address gas monitoring or monitoring apparatus of the laboratory or scientific type used for analysis or measurement, apparatus used for process control and process monitoring purposes, or apparatus used for residential purposes.
- 1.2.4 The user should be aware of environmental effects on both the instrument and the toxic gas. The effects are not intended to be evaluated by this standard.
- 1.2.5 Toxic Gases (for gases listed in ANSI/ISA-92.00.01-2010)

Note: The 2010 edition is considered to be the minimum requirements. A later edition is permitted to be used once published.

- 1.2.5.1 Toxic gas detectors for the detection of the gases listed in ANSI/ISA-92.00.01 shall comply with the requirements of this standard and all applicable requirements in ANSI/ISA-92.00.01 including acceptance criteria as defined within Annex A of ANSI/ISA-92.00.01.
- 1.2.6 Toxic Gases (for gases not listed in ANSI/ISA-92.00.01-2010)

- 1.2.6.1 Toxic gas detectors for the detection of the gases not listed in ANSI/ISA-92.00.01-2010 shall comply with the requirements of this standard and all applicable requirements in ANSI/ISA-92.00.01-2010 with acceptance criteria defined as the manufacturer's claimed performance for each gas type. The performance parameters shall be clearly identified within the manufacturer's instruction manual. The performance parameters of each gas shall include all of the following:

the gas name and common formula

range(s) (for multiple ranges performance parameters shall be stated for each range)

accuracy (to be in the format: "± xx ppm or ± xx % of reading whichever is greater")

Response Time (T20), Response Time (T50), Response Time (T90), Recovery Time (T10).

Response and Recovery time shall be of Final Value (seconds), where Final Value = value

after stabilization.

Temperature range over which the stated accuracy applies.

1.2.7 Oxygen Depletion

- 1.2.7.1 Gas detectors for the detection of oxygen levels below 21% by volume shall comply with the requirements of this standard and all applicable requirements in ANSI/ISA-92.04.01-1996.

Note: The 1996 edition is considered to be the minimum requirements. A later edition is permitted to be used once published.

1.2.8 Common Low Concentration Gases

- 1.2.8.1 For a gas detector which measures a gas that is also flammable, this standard is applicable for ranges from ppm level up to 3% of the lower flammable limit. For example, hydrogen – with an LFL of 4%v/v (40,000 ppm) shall be tested as a toxic gas up to a concentration of 1200 ppm. Measurement levels above 1200 ppm shall be tested as a flammable gas.

1.3 Basis for Requirements

- 1.3.1 The requirements of this standard are based on experience, research and testing, and/or the standards of other organizations. The advice of manufacturers, users, and loss control specialists was also considered.
- 1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of toxic and oxygen depletion gas detectors for the purpose of obtaining certification. Toxic and oxygen depletion gas detectors having characteristics not anticipated by this standard may be certified if performance equal or superior to that required by this standard is demonstrated.

1.4 Basis for Certification

Certification is based upon satisfactory evaluation of the product and the manufacturer in the following major 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 shall be required by the certification agency in accordance with the certification scheme to ensure ongoing compliance.

1.5 Basis for Continued Certification

Continued certification is based upon:

- 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;
- satisfactory surveillance audits conducted as part of the certification agencies product surveillance program.

1.6 Effective Date

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.

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

Where units of measurement are expressed in U.S. customary units, they are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. Conversions are in accordance with ANSI/IEEE/ASTM SI-10. Where units of measurement are expressed in SI units, no US customary units are provided.

1.8 Normative References

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

ANSI/ISA-92.00.01, Performance Requirements for Toxic Gas Detectors,

ANSI/ISA-92.04.01, Part I, Performance Requirements for Instruments Used to Detect Oxygen-Deficient/Oxygen-Enriched Atmospheres

FM Approvals Examination Standard 3600, General Requirements for Electrical Equipment

1.9 Definitions

For purposes of this standard, the definitions within ANSI/ISA-92.00.01 and ANSI/ISA-92.04.01, Part I apply, including the following additional terms:

Aspirated Apparatus — An apparatus which samples the atmosphere by drawing it to the sensor, for example by means of a hand operated or electric pump.

Dead Space — An actual or potential area within a chamber where the gas is stagnant (not mixing and/or still)

Fault Signal — An audible, visible, or other type of output providing, directly or indirectly, a warning or indication that the apparatus is not working satisfactorily.

Zero Indication — (excluding oxygen gas detector) The indication given by properly adjusted apparatus when exposed to clean air in normal operating conditions.

Special State — All states of the apparatus other than those in which monitoring of gas concentration takes place, for example warm-up, calibration mode or fault condition.

Transmitter — Stand-alone gas detection apparatus for use with separate control units includes apparatus that provide a conditioned electronic signal or output indication intended to be used with stand-alone control units, separate signal processing, data acquisition, central monitoring or other similar systems which typically process information from various locations and sources including, but not limited to, gas detection instrumentation.