

TECHNICAL REPORT

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**Guide for Toxic Gas Detection
as a Method of Personnel Protection**

**A Technical Report prepared by ISA
and registered with ANSI**

Approved 15 June 2014

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Foreword

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The primary reason for development of this technical report is to provide guidance on the use of toxic gas detectors as a method of personnel protection.

Abstract

This document provides guidance on the use of toxic gas detection as a method of protection as within guidance by OSHA regulations Title 29 Code of Federal Regulation (CFR) Part 1910 Subpart Z.

Keywords

Equipment, toxic gas detection, fixed equipment, toxic gas, gas concentration, hot work permit, portable equipment, transportable equipment

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Introduction

Toxic gas detection equipment should be used whenever there is the possibility of a hazard to life, caused by the accumulation of a toxic gaseous atmosphere. Such equipment can provide a means of reducing the hazard by detecting the presence of the toxic gas and issuing suitable audible or visual warnings. Toxic gas detection equipment and systems may also be used to initiate specific actions such as increased ventilation rates, plant shutdown, evacuation, and operation of other procedures.

Toxic gas detection equipment may be used to monitor hazardous levels of a gas atmosphere where accumulation of gas may result in hazard to life.

Performance requirements for toxic gas detecting equipment are set out in ANSI/ISA-92.00.01 and ANSI/ISA-92.00.04.

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1 Scope

Toxic gas detection in process safety management provides personnel protection by minimizing the probability of toxic gases reaching hazardous levels. Criteria are developed to establish toxic gas levels to initiate alarms, initiate increase in ventilation rates and to initiate shutdown of processes generating the toxic gas that has breached containment. This guide provides techniques for the use of toxic gas sensors and controllers to monitor and control sources of toxic gas release into the atmosphere within designated spaces in industrial locations.

1.1 This document provides guidance on the use of toxic gas detection as a method of personnel protection as discussed within the following:

- Title 29 Code of Federal Regulations Part 1910.1000 Sub Part Z Toxic and Hazardous Substances (OSHA).

1910.1000 (a) An employee's exposure to any substance listed in Tables Z-1, Z-2, or Z-3 of this section shall be limited in accordance with the requirements of the following paragraphs of this section

1910.1000(e)

To achieve compliance with paragraphs (a) through (d) of this section, administrative or engineering controls must first be determined and implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or any other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in this section. Any equipment and/or technical measures used for this purpose must be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with 1910.134.

NOTE 1 Refer to Title 29 CFR Part 1910.1000 for full guidance provided in the document.

NOTE 2 The tables in sub part Z which apply to toxic gas limits are Table Z-1 Limits for Air Contaminants and Table Z-2 TWA's and Ceiling Concentrations.

1.2 This document provides guidance on the use of fixed, portable and transportable toxic gas detection equipment for protection of personnel in industrial locations.

NOTE Applicable toxic gas detection equipment performance standards include ANSI/ISA-92.00.01 and ANSI/ISA-92.00.04.

1.3 This document provides guidance on the use of toxic gas detection as a supplement in adequately ventilated spaces.

1.4 For the purpose of this document, equipment includes

fixed equipment;

portable equipment; and

transportable equipment.

1.5 This document is not intended to cover the following:

- a) Equipment intended only for the detection of combustible gases (refer to ANSI/ISA-12.13.01)
- b) Equipment of laboratory or scientific type intended only for analysis or measurement purposes
- c) Equipment intended for mining applications
- d) Equipment intended for applications in explosives processing and manufacturing