

CGA P-20—2009

**STANDARD FOR
CLASSIFICATION OF
TOXIC GAS MIXTURES**

FOURTH EDITION



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Specialty Gases Committee

NOTE—Technical changes from the previous edition are underlined.

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1 Introduction

Pure gas toxic designations are well known. However, the gases included in this standard vary according to the meaning of “toxic” or “poison,” as defined by U.S. Department of Transportation (DOT) in Title 49 of the U.S. *Code of Federal Regulations* and Transport Canada (TC) in *Transportation of Dangerous Goods (TDG) Regulations* [1, 2].¹ Label requirements and hazard classes for pure gases reflect DOT and TC requirements. Additional labels denoting more than the toxic hazard class may be required.

Information on toxicity of gases has been obtained from a variety of sources. Specifically, LC₅₀ and LC_{LO} data were obtained from the National Institute of Occupational Safety and Health (NIOSH), *Registry of Toxic Effects of Chemical Substances (RTECS)* and Sax's *Dangerous Properties of Industrial Materials*, Sixth Edition [3, 4].

2 Scope and purpose

2.1 Scope

This standard applies to all users, transporters, and manufacturers affected by label requirements and addresses classifications for gas mixtures that contain a toxic component(s). This standard categorizes gas mixtures under the transportation regulations by establishing a measurement criterion based on LC₅₀ RAT values. The resultant criterion is the basis for a method to calculate gas mixture toxicity.

2.2 Purpose

The purpose of this standard is to establish a means to classify toxic gas mixtures based on acute toxicity.

3 Definitions

For the purpose of this standard, the following definitions apply.

3.1 Immediately dangerous to life or health (IDLH)

Level defined by NIOSH determined to be immediately dangerous to life or health. This term is used for the purpose of respirator selection and represents a maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without experiencing any escape impairing or irreversible health effects.

3.2 Lethal concentration fifty (LC₅₀)

Concentration of a substance in air, exposure to which for a specified length of time is expected to cause the death of 50% of the entire defined experimental animal population.

NOTE—For this publication, LC₅₀ is defined by the following procedure: ten albino rats (five male and five female) are exposed to a test atmosphere for 1 hour and observed for 14 days. If five of the animals die within the 14-day observation period, the concentration level of the test atmosphere is the LC₅₀. Where test data is not available, an LC₅₀ value shall be assigned. See 4.2 for the selection of this LC₅₀ value.

3.3 Lethal concentration low (LC_{LO})

Lowest concentration of a substance in air, other than LC₅₀, that has been reported to have caused death in humans or animals. The reported concentrations may be entered for periods of exposure which are less than 24 hours (acute) or greater than 24 hours (subacute and chronic).

3.4 Lethal dose fifty (LD₅₀)

Lethal dose to 50% of a specified population.

3.5 Mole fraction

Concentration ratio of a component in a gas mixture.

3.6 ppm

Parts per million, by volume (mole fraction) for gases.

¹ References are shown by bracketed numbers and are listed in order of appearance in the reference section.