



ANSI/AIHA Z9.1–2006

American  
National  
Standard  
for

**Ventilation and  
Control of Airborne  
Contaminants  
During Open-  
Surface Tank  
Operations**



A Publication by  
**American Industrial Hygiene Association**

**ANSI Z9.1—2006**

# American National Standard — Ventilation and Control of Airborne Contaminants During Open-Surface Tank Operations

Secretariat

**American Industrial Hygiene Association**

Approved: August 18, 2006

**American National Standards Institute, Inc**

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**FOREWORD** (This foreword is not part of the American National Standard/AIHA Z9.1-2006)

This standard was developed from extended and careful examination of successful current practice in the control of health hazards resulting from open-surface tank operations. The requirements set forth are considered the minimum necessary to ensure the safety of the workers involved. Appendix A contains information on the properties of potentially toxic contaminants.

Much of this standard is drawn from an earlier standard: ANSI Z9.1-1991, Open-Surface Tanks--Ventilation and Operation. Prior to the 1991 edition, there were four earlier versions of the standard: ANSI Z9.1-1977 (administratively withdrawn by ANSI on March 2, 1988), ANSI Z9.1-1971, ANSI Z9.1-1951, and ANSI Z9.1-1941.

*How to read this Standard:* The Standard is presented in a two-column format. The left column presents the requirements of the Standard; the right column provides clarification and explanation of the requirements plus "how to comply" information.

This standard also contains Appendices, which are informative and are not considered a mandatory part of this standard.

*Flexibility:* Requirements are minimum criteria and can be adapted to the needs of the user. Demonstrably equal or better approaches are acceptable. Where standard provisions are in conflict with other standards and codes, the more stringent should be applied. Where the user deviates from Standards requirements, the user should document justification for the deviation.

*Auditing:* The Standard is auditable. An Audit Form is provided in Appendix B.

*Response and Update:* Please contact the American Industrial Hygiene Association if you have questions, comments, or suggestions. As with all ANSI standards, this is a "work in progress." New technology and research continues to change this field and it is hoped that future versions of the standard will reflect this growth in knowledge. Suggestions for improvement are welcome, and should be sent to the American Industrial Hygiene Association (Attn: Scientific and Technical Initiatives), 2700 Prosperity Avenue, Suite 250, Fairfax, VA 22031 <http://www.aiha.org>.

This standard was processed and approved for submittal to ANSI by the Z9 Accredited Standards Committee on Health and Safety Standards for Ventilation Systems. Committee approval of the Standard does not necessarily imply that all committee members voted for its approval. At the time it approved this Standard the Z9 Committee had the following members:

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L. DiBerardinis, Vice Chair  
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# American National Standard — Ventilation and Control of Airborne Contaminants During Open-Surface Tank Operations

## 1. Scope, Purpose and Application

### 1.1 Scope

This standard establishes minimum control requirements and ventilation system design criteria for controlling and removing air contaminants to protect the health of personnel engaged in open-surface tank operations. It is not intended to cover fire protection.

### 1.2 Objectives

The objectives of this standard are to:

- Protect the health and well-being of open-surface tank workers by establishing minimum requirements to control emissions of gases, vapors, or mists from open-surface tank operations.
- Prevent explosive concentration of gases or vapors in ducts, hoods, and enclosures.
- Protect workers from splashes and other contact with liquids.
- Prevent objectionable increases in humidity.
- Advise establishments to conform to local or state air pollution regulations.

Because of the wide variation between operations, locations, work practices, construction, equipment age, and so forth, compliance with this standard cannot guarantee that the objectives of Paragraph 1.2 will be met at all times and at all locations.

### 1.3 Application

This standard applies to those establishments that have open surface tanks involved in the immersion of parts in liq-

uids or vapors for the purpose of cleaning, altering the surface, adding a finish, or changing the character of the materials. These operations include but are not limited to wet processes such as: washing, electroplating, anodizing, pickling, quenching, dyeing, dipping, tanning, dressing, bleaching, degreasing, alkaline cleaning, stripping, rinsing, digesting, and other similar operations.

### 1.4 Exclusions

This standard does not apply to (1) molten materials handling operations; (2) surface coating operations, excluding open-tank operations; and (3) wet-sink operations in semiconductor manufacturing operations that are designed and operated to comply with SEMI ventilation standards.

- (1) Molten materials handling operations are all operations involving the use, melting, smelting, or pouring of metals, alloys, or other similar substances in the molten state. This includes heat-treating baths, descaling baths, die casting, stereotyping, galvanizing, and tinning operations.
- (2) Surface-coating operations refers to operations involving the application of protective, decorative, adhesive, or strengthening coating or impregnation to one or more surfaces or into the interstices of any object or material by means of spraying, spreading, flowing, brushing, roll-coating, pouring, and cementing, e.g. paint-dripping operations.
- (3) Wet-sink (wet-station) operations normally occur in special clean-