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ANSI/AIHA Z9.2-2012

Fundamentals Governing the Design and Operation of

Local Exhaust Ventilation Systems

*A Publication by
American Industrial Hygiene Association®*



BY THE ANSI/AIHA Z9.2 SUBCOMMITTEE



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ANSI/AIHA® Z9.2-2012

American National Standard — Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

Secretariat

American Industrial Hygiene Association

Approved: March 6, 2012

American National Standards Institute, Inc.

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Note: Standard Paragraphs denoted with a "See Appendix" indicate that there is an entry in the Appendix for that Paragraph which provides additional explanatory information on the Paragraph topic.

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Foreword

This standard describes fundamental good practices related to the commissioning, design, selection, installation, operation, maintenance, and testing of local exhaust ventilation (LEV) systems used for the control of employee exposure to airborne contaminants. It is intended for use by LEV system owners, employers, industrial hygienists, facility engineers, maintenance personnel, testing and balancing personnel, ventilation system designers, and others with responsibility for LEV systems. It is compatible with the ACGIH® *Industrial Ventilation Manual* and other recognized standards of good practice.

A document describing fundamentals of exhaust system design was originally published in 1936. This was formalized by the Z9 Committee under the direction of Knowlton Caplan, and published in 1960, with updates in 1971 and 1979. The 2001 edition, under the direction of Jeff Burton, constituted a major revision of that earlier document and was a more performance based document with a systems orientation that appealed to a wider audience. Much of the previously included technical design detail had been left to other, more thorough and comprehensive sources. This 2012 version is an additional update of the 2006 updated version.

How to Read this Standard

The standard is presented in 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. Appendix A provides supplementary information by Standard section number. The designation, “(See Appendix)”, at the end of a section designates an Appendix entry for that section and paragraph.

Requirements should be considered minimum criteria and can be adapted to the needs of the User establishment. Demonstrably equal or better approaches are acceptable. When deviating from the Standard, documentation should be provided. The Standard is auditable by those trained in local exhaust ventilation. An Audit Form is provided in Appendix B.

Suggestions for improvement of this standard are welcome. The Committee will carefully consider all comments and suggestions. Comments should be sent to Attn: Scientific and Technical Initiatives, AIHA®, 3141 Fairview Park Drive, Suite 777, Falls Church, VA 22042.

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:

Thomas C. Smith, Chair
Theodore J. Knutson, PE, Vice Chair
David Hicks, Secretariat Representative

Organization RepresentedName of Representative

Alliance of American Insurers	S. Ecoff
American Chemical Society	D. Walters
American Conference of Governmental	G. Knutson
American Foundrymen's Society	R. Scholz
Industrial Hygienists	
American Society of Heating, Refrigerating, and Air Conditioning Engineers	T.C. Smith
American Society of Safety Engineers	P. Osley
Massachusetts Institute of Technology	L.J. DiBerardinis
National Association of Metal Finishers	K.C. Hankinson
National Spray Equipment Manufacturers Association	D.R. Scarborough
U.S. Department of Labor Occupational Safety and Health Administration	L. Hathon

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S.J. Gunsel	M. Rollins
T. Knutson	D.R. Scarbrough
N. McManus	J.W. Sheehy

Subcommittee Z9.2 on Local Exhaust Systems, which developed this standard, had the following members:

D. Jeff Burton, Chair	J. Throckmorton
C. Figueroa, Vice Chair	S. Swanson
K. Paulson	R.T. Hughes
J.C. Rock	L.J. DiBeradinis
T.C. Smith	G. Hrbek, as a Technical Resource
L.K. Turner	

American National Standard — Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

Requirements of the Standard

1. Scope

- 1.1 This Standard establishes minimum requirements for the commissioning, design, specification, construction, and installation of fixed industrial local exhaust ventilation (LEV) systems used for the reduction and prevention of employee exposure to harmful airborne substances in the industrial environment.
- 1.2 The Standard also establishes fundamental requirements for the management, operation, maintenance, and testing of LEV systems to assure satisfactory performance over the life of the system.
- 1.3 The Standard also describes basic requirements for replacing air exhausted from the space.
- 1.4 The Standard does not cover:
- ventilation for comfort,
 - air moving systems which are part of an industrial process,
 - paint booths not used primarily for employee protection, or
 - energy conservation
- except when they also impact or apply to airborne contaminant control for employee protection.
- 1.5 Where Standard provisions are in conflict, the more stringent shall apply.

Clarification and Explanation of the Requirements

1. Scope

- 1.1 Local exhaust ventilation is an important engineering control technique for maintaining acceptable air quality in the industrial work environment. Its major approaches are the capture, control, or containment of airborne contaminants at or as close as possible to the point of contaminant generation. LEV is often used with other control methods, e.g., isolation, dilution ventilation, or personal protective equipment. Properly designed, installed and operated, LEV systems can provide excellent control of airborne contaminants.
- 1.3 Replacement air systems that are improperly designed, installed or operated can impair otherwise acceptable LEV systems.
- 1.4 No ventilation standard can provide complete and comprehensive coverage of every application and technical problem encountered when applying LEV systems to the wide range of processes and equipment found in industry. The User should refer to appropriate technical references and publications for further guidance on uses and applications of local exhaust in specific applications. (See Appendix)
- 1.5 Because some sections are written to stand alone, they may duplicate requirements of other sections. Efforts to avoid conflicts within the Standard have been taken but every consensus and committee-generated standard has the possibility of conflicts.