

OSHA

guidebook for labs



SECOND EDITION

OSHA

Guidebook for Labs

S E C O N D E D I T I O N



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Contents

Introduction	v
Acronyms and abbreviations	vi
Access to records (1904, 1910, 1020, 1913.10, and others)	1
Air contaminants (1910.1000)	5
Asbestos (1910.1001 for general industry and 1926.1101 for construction)	11
Bloodborne pathogens (1910.1030)	45
Compressed gases (1910.169)	67
Confined spaces (1910.146)	73
Construction/renovation (1926)	87
Electrical safety (1910, subpart S)	101
Emergency plans (1910.38)	105
Emergency response/HAZWOPER (1910.120)	107
Employee health services	115
Ergonomics (voluntary guideline)	125
Ethylene oxide (1910.1047)	131
Exiting (1910.36)	149
Eye/face protection (1910.133 and various standards)	151
Eyewash/emergency shower (1910.151)	153
Fire prevention and protection (1910.155 to 1910.165)	155
Formaldehyde (1910.1048)	169
General duty clause	189
Glutaraldehyde	191
Hazard communication standard (29 CFR 1910.1200)	195
Hearing/noise exposure (1910.95)	209
Laboratory standards (1910.1450)	219

Contents

Lasers (guidance)	237
Laundry/housekeeping	251
Lead (1926.62 [construction work] and 1910.1025 [general industry])	263
Lockout/tagout (1910.147)	277
Machine guarding (1910.212)	287
Medical first aid (1910.151)	289
Mercury	291
Personal protective equipment (1910.132)	295
Radiation (1910.1096 [ionizing] and 1910.97 [non-ionizing])	303
Recordkeeping (1904)	315
Respiratory protection (1910.134)	335
Welding (1910.254 and 252)	357
Workplace violence (voluntary guideline)	359
Xylene	365
Appendix A: State occupational safety health plans	373
Appendix B: OSHA standards training frequency	385

Introduction

This reference guide reviews the top Occupational Safety and Health Administration (OSHA) standards with which laboratory safety managers regularly deal. Although no chapter is intended to be a substitute for an entire standard, this book outlines the major points of the laboratory-related regulations in an easy-to-read format. You will be able to navigate through the requirements quickly and confidently.

We've packed a lot of vital information into this guide. But, knowing how busy you are, we have kept it manageable and practical. All topics are organized alphabetically, and each page is marked with a shaded tab, enabling you to flip quickly through the guide to find the information you need. Also, commonly used acronyms and abbreviations are listed at the start of the guide for handy reference.

It is our job to review the information and condense it into an understandable guide so that you can have everything related to OSHA and laboratories in one place. We hope you find it indispensable.

Acronyms and abbreviations

- ACGIH:** American Conference of Governmental Industrial Hygienists
- ACIP:** Advisory Committee on Immunization Practices
- ACM:** asbestos-containing materials
- ANSI:** American National Standards Institute
- ASME:** American Society of Mechanical Engineers
- BLS:** Bureau of Labor Statistics
- BSI:** body substance isolation
- CAT:** computerized axial tomography
- CERCLA:** Comprehensive Environmental Response, Compensation, and Liability Act
- CGA:** Compressed Gas Association
- CDC:** Centers for Disease Control and Prevention
- CHO:** chemical hygiene officer
- CHP:** chemical hygiene plan
- CPR:** cardiopulmonary resuscitation
- dB(A):** decibels on the A scale
- DOT:** Department of Transportation
- EAP:** employee assistance program
- EC:** environment of care
- EHS:** employee health service
- EMS:** emergency medical service
- EPA:** Environmental Protection Agency
- EPCRA:** Emergency Planning and Community Right-to-Know Act
- ESLI:** end-of-service-life indicator
- EtO:** ethylene oxide
- FDA:** Food and Drug Administration
- FPM:** feet per minute

HAZWOPER: Hazardous Waste Operations and Emergency Response

HBV: hepatitis B virus

HEPA: high-efficiency particulate air

HICPAC: Hospital Infection Control Practices Advisory Committee

HIV: human immunodeficiency virus

Hz: hertz

IARC: International Agency for Research on Cancer

IDLH: immediately dangerous to life or health

JCAHO: Joint Commission on Accreditation of Healthcare Organizations

LEPC: local emergency planning committee

LSC: *Life Safety Code*®

LSO: laser safety officer

MPE: maximum permissible exposure

MSD: musculoskeletal disorder

MSDS: material safety data sheets

NFPA: National Fire Protection Association

NHZ: nominal hazard zone

NIOSH: National Institute for Occupational Safety and Health

NM: nanometer

NRC: Nuclear Regulatory Commission

NTP: National Toxicology Program

OPIM: other potentially infectious material

OSHA: Occupational Safety and Health Administration

PACM: presumed asbestos-containing materials

PAPR: powered air-purifying respirator

PEL: permissible exposure limit

PPE: personal protective equipment

PPM: parts per million

PSI: pounds per square inch

QLFT: qualitative fit test

Acronyms and abbreviations

- QNFT:** quantitative fit test
- RCRA:** Resource Conservation and Recovery Act
- SARA:** Superfund Amendments Reauthorization Act
- SCBA:** self-contained breathing apparatus
- SOP:** standard operating procedure
- STEL:** short-term exposure limit
- STS:** standard threshold shift
- TB:** tuberculosis
- TLV:** threshold limit value
- TSD:** treatment, storage, and disposal (facility)
- TSI:** thermal systems insulation
- TWA:** time-weighted average
- UP:** universal precautions

Access to records (1904, 1910, 1020, 1913.10, and others)

at a glance



Records must be made available upon request to current or former employees, employee representatives, OSHA, and NIOSH for examination and copying. Records must be preserved and maintained. Confidentiality issues are addressed.

Under 29 CFR 1910.1020, requirements apply to the maintenance and retention of records for medical surveillance, exposure monitoring, inspections, and other activities and incidents relevant to occupational safety and health.

Individual health records must be kept in the employee health-service department. OSHA defines an employee medical record as one that concerns the health status of an employee and is made or maintained by a physician, registered nurse, or other healthcare professional or technician. Each employee health record must be maintained for the duration of employment plus 30 years, unless a specific occupational safety and health standard requires a different period of time. Laboratory reports and worksheets need to be kept for only one year.

Employers are required to maintain accurate records of certain potentially toxic or harmful physical agents that must be monitored or measured. Employers must promptly advise employees of any excessive exposure and the corrective action taken. In certain cases, physical examinations and testing are required. OSHA requires that the employee exposure records be maintained for the duration of employment plus 30 years. Employees or their designated representatives have a right to review their individual employee medical records and records that describe employee exposures.

When employees request their exposure records, the employer is required to furnish them within 15 days. Employee representatives also may examine and copy a worker's exposure records. If prescribed procedures are followed, OSHA has the right to see exposure records.

Confidentiality

Employee health records must be treated with the level of confidentiality necessary to protect employee privacy. The employer must make the records available to the employee—or authorized representative—if requested by the employee. Employees or their representatives have the right to examine and copy the results of exposure monitoring.

The employee exposure record must also contain the following:

- Environmental monitoring, specific sampling results, the collection methodology, a description of the analytical and mathematical methods used, and a summary of other background data relevant to interpretation of the results obtained
- Biological monitoring results that directly assess the absorption of a hazard
- MSDSs or a hazard inventory that describes chemicals and identifies where and when they are used

Exemptions

The following types of records are exempt from the retention rule:

- Health-insurance claims maintained separately from the employer's medical program and its records
- First-aid records of one-time treatment and subsequent observation
- Medical records of employees who have worked for less than one year for the employer need not be retained beyond the term of employment if they are provided to the employee upon termination

- Records that concern voluntary EAPs (alcohol, drug abuse, or personal counseling), if maintained separately from the employer's medical program and its records

Additional requirements

The records-access standard also includes the following provisions:

- The storage of information in any form—document, microfilm, x-ray, or automated data processing—is permitted, but chest x-rays must be kept in their original state
- Employer trade secrets should conform with OSHA's hazard-communication standard
- Employee representatives (such as union representatives) must show an occupational health need for requested records when seeking access to employee exposure records without consent

Similar provisions apply to employees' medical records. However, for privacy interests, employee representatives are allowed access to the records only with written consent of the employee concerned. The records-access rule requires that employees be informed upon employment, and annually thereafter, of their rights of access to the records and the correct procedures for exercising those rights.

Air contaminants (1910.1000)

at a glance



The air contaminants standard sets exposure limits for hundreds of substances contained in gases, fumes, and dust, and requires monitoring.

Laboratory employees may be exposed at times to a variety of harmful materials in the air, including gases, dusts, mists, vapors, fumes, and other substances.

OSHA issued the air-contaminants standard to require employers to monitor employee exposure to potentially harmful chemicals and other airborne substances, and to keep such exposures within permissible limits. Employers that fail to comply with the air-contaminants standard could be subject to enforcement action.

Employers also are required to provide hazard information and training to employees who may be exposed to chemicals covered under the air-contaminants standard.

Regulated substances

Chemical substances used in healthcare facilities and regulated under the air-contaminants standard include

- mercury
- methyl methacrylate
- methanol
- xylene
- ammonia
- chlorine
- chlorofluorocarbons or Freon™

To comply with the air-contaminants standard, employers should take an inventory of each work-site to determine whether hazardous air contaminants are present, the levels of such contaminants, and how they can be controlled or mitigated as required.

Permissible exposure limits (PEL)

The air-contaminants standard specifies PELs for hundreds of potentially hazardous chemicals and other substances. PELs are based on three different increments of time:

- An eight-hour measurement taken to determine the TWA
- A 15-minute measurement for a STEL
- An instantaneous measurement for the ceiling limit

Many PELs have not been updated in years and are considered by some safety experts to be too permissive to adequately protect workers. Some experts advise employers to reduce the likelihood of endangering workers and being cited for a safety violation by using exposure limits adopted by OSHA for the purpose of updating the standard in 1989. Alternatively, employers may wish to follow current recommendations of the ACGIH or NIOSH.

Monitoring methods

Tools commonly used to obtain required measurements include

- personal dosimeters/monitoring badges
- detector tubes
- industrial hygiene methods, such as vacuum pumps and a variety of filter media

More sophisticated means include use of portable gas chromatographs and infrared spectrophotometers.

Recordkeeping requirements

All air-monitoring data must be recorded and retained by the employer for a minimum of 30 years. These records also must be made available to employees in accordance with OSHA requirements.

Required exposure controls

Employers are required to enable administrative or engineering controls to bring employee exposure levels within permissible limits. Only in cases where such controls are not feasible may PPE and other measures be used to meet the PELs.

All control measures must be approved for that specific use by a competent industrial hygienist or other technically qualified person.

Hierarchy of controls

Industrial hygienists commonly follow a system known as the “hierarchy of controls” to ensure that the most consistent means of controlling a hazard is used wherever possible. The system ranks controls in descending order of consistency and overall effectiveness. An example of this approach would be installation of local-exhaust ventilation to remove glutaraldehyde fumes from a medical sterilization area, rather than simply requiring employees to wear respirators when working there.

The air-contaminants standard requires employers to institute the hierarchy of controls to a certain extent, as engineering and administrative controls must be used wherever possible before work-practice and other controls may be relied upon to meet the PELs. However, the regulation in some cases allows employers to rely upon employee rotation—an administrative control—to limit exposures to hazardous substances. This method is rejected by many safety experts as inconsistent with the goal of reducing hazardous exposures for the greatest number of employees.

Control methods

Employee exposure to air contaminants can be prevented or reduced through various control methods:

- Elimination of the hazard (e.g., by contracting with an outside firm that provides services such as medical-instrument sterilization).
- Substitution of less-toxic materials.
- Change of a process.
 - Isolation (e.g., placing the hazardous process in a separate room or in a corner of the building to reduce the number of persons exposed).
 - Engineering controls are used to control a hazard at the source. Primary examples include local-exhaust ventilation, general dilution ventilation, and closed systems.
- Administrative controls (e.g., limiting the total amount of time an individual is exposed to a health hazard, or rotating two or more workers each day).
- Training and information—Employees should be told what hazards they are exposed to and the safe-work practices they should use to reduce or limit exposure.
- Personal hygiene—Employees who are exposed to hazardous substances should wash their hands before eating, smoking, or using toilet facilities. Skin exposed to chemicals such as alkalis, acids, solvents, and strong cleaning agents should be washed immediately. Employees should not be permitted to eat around toxic chemicals or in contaminated areas. Clothing should be changed and washed daily if it becomes contaminated with toxic chemicals, dusts, fumes, or liquids.
- PPE—Items such as respirators, protective clothing, and protective equipment must be made available. The items should be provided and maintained in compliance with OSHA requirements for PPE.

Identifying hazardous substances

Often, health hazards associated with air contaminants are not recognized because materials used in them are identified only by trade names. A further complication arises from the fact that materials tend to contain mixtures of substances, which makes identification difficult. To identify occupational health hazards in a particular workplace, a materials analysis should be conducted at each operation to show all chemicals used and all products and byproducts formed. All hazardous substances should then be listed and evaluated. The most likely mode of exposure should be noted (e.g., ingestion, skin absorption, or inhalation). Most of this information is available on the MSDS that is supplied with the product upon purchase or delivery.

After this analysis is completed, related activities such as maintenance and service operations should be examined for health-hazard potential. Control measures should be activated where necessary to keep exposure within permissible or recommended limits.