Part 451. Respiratory Protection

Biohazard Emergency Response

Presented By:
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Agenda

- MIOSHA Part 451 Respiratory Protection Standard
- Written Respiratory Protection Program
- Biohazards and Respiratory Protection
- Selection of Respirators
- Medical Evaluation
- Fit-testing and Seal Checks
- Training Requirements

MIOSHA Part 451 Respiratory Protection [OSHA 29 CFR 1910.134]

- Permissible practice
- Definitions
- Respiratory protection program
- Selection of respirators
- Medical evaluation
- Fit testing
- Use of respirators
- Maintenance and care of respirators
- Breathing air quality and use
- Identification of filters, cartridges, and canisters
- Training and information
- Program evaluation
- Recordkeeping
- Appendices

Is Respiratory Protection Required?

Are there conditions to which the employee is exposed that can cause occupational disease?

Are there no feasible engineering controls available to control employee exposure?

If yes, employer must implement a full respiratory protection program.

Respiratory Protection Program

- Designate qualified program administrator
- Provide respirators, training, and medical surveillance at no cost to employees
- Key components:
  - selection procedure
  - medical evaluations
  - fit testing procedures
  - procedures for proper use and maintenance
  - procedures for cleaning, disinfecting, storing, etc.
  - procedures to ensure adequate air quality, quantity and flow
  - employee training
  - program evaluation (annual)

Qualified Program Administrator

Duties: manage the respirator program and evaluate its effectiveness

Qualifications: training or experience to fulfill the requirements of recognizing, evaluating, and controlling the hazards in the workplace

Selection of Respirators

- Use NIOSH certified respirators
- Identify and evaluate respiratory hazards:
  - Reasonable estimate of exposure level
  - Chemical state and physical form
  - Cannot identify or estimate = IDLH
- Sufficient number of models and sizes
- Respirators for IDLH atmospheres
- Respirators for non-IDLH atmospheres

Respiratory Protection Information

National Institute for Occupational Safety and Health (NIOSH) is the gatekeeper for respiratory protection – establishes test criteria.

The Assigned Protections Factor (APF): number representing the protection offered by the rated respirator as a multiple of the Permissible Exposure Limits

Examples:

- Respirator with an APF of 10 = approved for use when exposures up to 10x the permissible exposure limit
- Respirator with APF of 50 = approved for use when exposures up to 50x the permissible exposure limit

Air-Purifying Respirators(APR): Assigned Protection Factors (APF)

Powered Air-Purifying Resp. (PAPR)

APF = 25

Atmosphere-supplying Respirators

Positive Pressure:

-Self-contained Breathing Apparatus (SCBA) APF = 50 - 10,000

-Supplied Air Respirator (SAR) APF = 50 - 1000

APFs and Biohazards

- APF is based on Permissible Exposure Limits
- No airborne exposure limits established for biohazards
- No “Immediately Dangerous to Life and Health (IDLH)*” airborne concentration limits for biohazards

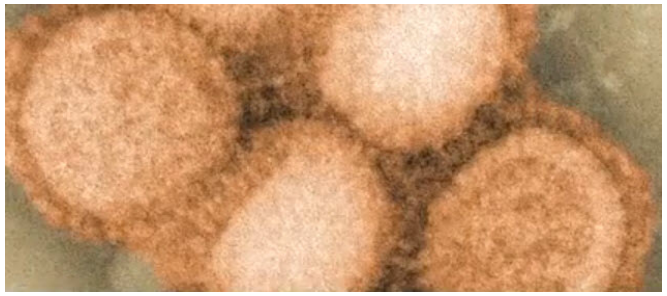
*An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual’s ability to escape from a dangerous atmosphere.

Here's what we know…

- Anticipated respiratory exposure when infectious agents suspended in air
- Protection required when considered a serious health threat (death or serious physical harm)
- NIOSH makes specific, risk-based protective recommendations for biological materials
- Recommend Respiratory protection against mists/particles = N-95, HEPA or atmosphere supplying

Airborne Infectious Agents (Healthcare)

- Tuberculosis
- SARS
- Pandemic Influenza (severe)
- Measles
- Chicken Pox
- Anthrax
- Hantavirus



At Risk Activities

- Caring for a patient who is know or suspected of having an airborne transmissible disease
- Performing aerosol generating procedures
- Entering in a negative pressure airborne-infection isolation room
- Transporting infectious patients in an enclosed vehicles
- First receivers of victims from a biological attack

Respirators for protection against TB

Under the 2005 CDC Guidelines:

- Non-powered, air-purifying particulate-filter respirators with N95, N99, N100, R95, R99, R100, P95, P99, or P100 filters (including filtering facepieces/dust masks),
- Powered air-purifying respirators (PAPRs) with HEPA filters, or
- Positive pressure airline (supplied air) respirators may be used for protection against airborne M. tuberculosis

Respirators for protection against TB

Under the 2005 CDC Guidelines:

Minimally acceptable = N-95 filtering facepiece when emergency medical response personnel or other workers transport, in a closed vehicle, an individual with suspected or confirmed infectious TB disease.

N-95 vs. High Efficiency Particulate Air (HEPA)

N-95 =

95% EFFICIENCY AT ≥0.3 MICRONS

N-100 AND HEPA =

99.97% EFFICIENCY AT ≥0.3 MICRONS

Chemical, Biological, Radiological, and Nuclear (CBRN) Respirators

Multi-Contaminant and CBRN agent = Olive colored canister

NIOSH Chemical, Biological, Radiological, and Nuclear (CBRN) Respiratory Protection Handbook , 2018

Chemical, Biological, Radiological, and Nuclear (CBRN) Respirators

NIOSH identified 13 biological particulate threats (bacteria, viruses, and toxins):

- Anthrax
- Brucellosis
- Glanders
- Pneumonic Plague
- Tularemia
- Q Fever
- Smallpox
- Venezuelan Equine Encephalitis
- Viral Hemorrhagic Fevers
- T-2 Mycotoxins
- Botulism
- Ricin
- Staphylococcus Enterotoxin B (Staphylococcus aureus)

2009 - Respiratory Protection Recommended for Biological Agents: Terrorism Event

- High Risk: NIOSH-approved, CBRN SCBA
- Medium Risk: CBRN full facepiece APR or CBRN full facepiece powered air-purifying respirator (PAPR)
- Low Risk: Half-mask filtering facepiece respirators

Reference:Recommendations for the Selection and Use of Respirators and Protective Clothing for Protection Against Biological Agents ,NIOSH 2009

2018 - NIOSH P100 and HEPA Cartridges

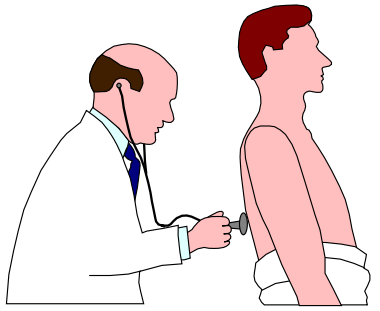
The respiratory route of exposure to biological agents may be through the dispersion of aerosols or droplets.

NIOSH-approved P100 filters are appropriate for filtration of these particles.

Reference: NIOSH Chemical, Biological, Radiological, and Nuclear (CBRN) Respiratory Protection Handbook , 2018

Medical Evaluation

- Must provide before fit testing and use
- Identify physician or other professional licensed health care provider (PLHCP) to perform using
  - medical questionnaire (Appendix C)
  - initial medical evaluation obtaining same information as medical questionnaire - follow-up exam on positive response to questionnaire
- Follow-up medical exam
- Written recommendation



Who is a PLHCP?

In the State of Michigan the only persons who can fulfill the role of a PLHCP under Part 451 Respiratory Protection are:

- Physician;
- Nurse practitioner, working under the supervision of a physician; and
- Physician's assistant (PA), working under the supervision of a physician.

Medical Determination

Obtain a written recommendation that contains

- Information only about the employee's ability to wear a respirator
- Any limitations on respirator use
- The need, if any, for a follow-up medical evaluation
- Statement that PLHCP has provided employee with copy of written recommendation
- Negative pressure respirator that may cause additional health issues to employee = PAPR if acceptable

Medical Evaluation - Frequency

Additional evaluations required when

- Employee reports signs or symptoms
- PLHCP, program administrator, or supervisor recommends (PLHCP usually = annual)
- Information from the respirator program indicates a need
- Changes in workplace conditions

Fit Testing

Must fit test all required respirators with tight-fitting face pieces

Required

- Prior to initial use
- Whenever a different respirator face-piece is used
- At least annually thereafter
- Report of changes in physical conditions

Fit test protocol described in Part 451 Appendix A

OSHA-Accepted QLFT and QNFT Protocol - Appendix A

QLFT protocol (Qualitative)

- isoamyl acetate (banana oil)
- saccharin mist
- Bitrex™
- irritant smoke

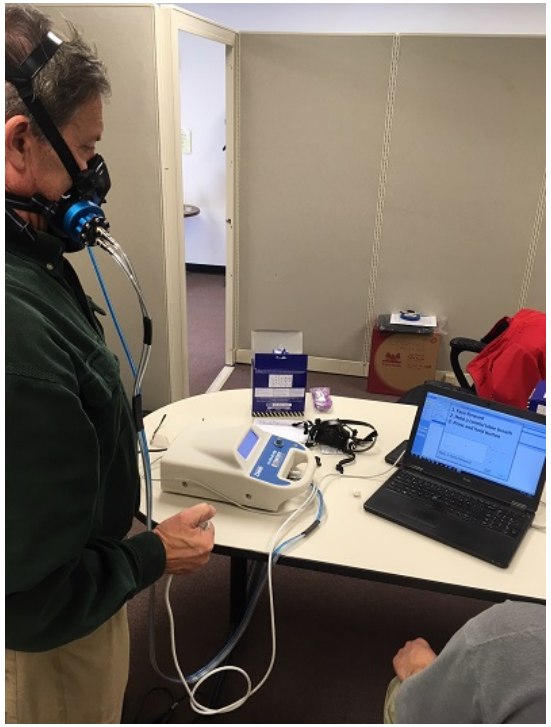
QNFT protocol (Quantitative)

- generated aerosol (corn oil, salt, DEHP)
- condensation nuclei counter (PortaCount)
- Controlled negative-pressure (Dynatech Fit Tester 3000)

Fit Testing

Port-a-Count
Quantatitive - QNFT

Controlled Negative
Pressure (CNP) - QNFT



Aerosol Method
Qualitative - QLFT

Positive and Negative Pressure Seal Checks

POSITIVE PRESSURE

NEGATIVE PRESSURE

Fit Testing - General

The test shall not be conducted if there is any hair growth between the skin and face-piece sealing surface…..

- Stubble beard growth
- Beard
- Mustache
- Sideburns (a.k.a. Mutton Chops)
- Apparel (uniform, coveralls, PPE)

Use of Respirators

Face-piece seal protection

- No facial hair
- No interference with sealing surface and valve function
- No interference between PPE use and respirator
- User seal (fit) check performed each time a respirator with a tight-fitting face-piece is donned (Appendix B-1)

Maintenance and Care of Respirators

The employer shall provide respirators that are clean, sanitary, and in good working order.

Appendix B-2, or

Equally effective manufacturer's procedures

Frequency:

- As often as necessary - sanitary condition
- Prior to use by another person on multi-user respirato
- After each use for
  - Emergency use respirator
  - Those used for fit testing and training

Cleaning and Disinfecting a Respirator

- Follow manufacturer's recommendations
- If a biological agent is suspected, strong disinfecting solutions can be used for initial decon of equipment

  Sodium hypochlorite/household bleach in a 1 to 10 ratio is effective for most, but not all biological agents (15 minute contact time)
- Protect skin from harsh chemical contact
- Caution when using phenols and "Quats" (asthma sensitizers)

Maintenance and Care of Respirators - continued

Storage

- Protect from damage, contamination, deformation
- Emergency respirators (compartments)

Inspection

- Routine use - before each use/during cleaning
- Emergency - performed monthly and documented
- Emergency escape - before carried into workplace for use

Repairs

- Properly trained person
- NIOSH-approved parts (same-for-same)
- Atmosphere supplying - manufacturer or trained tech

Respirator Inspections

Self-Contained Breathing Apparatus (SCBA)

Inspect monthly

Air/oxygen cylinders available for immediate use

Not to be below 90% of mfg. recommended level

Activate regulator and low pressure warning device

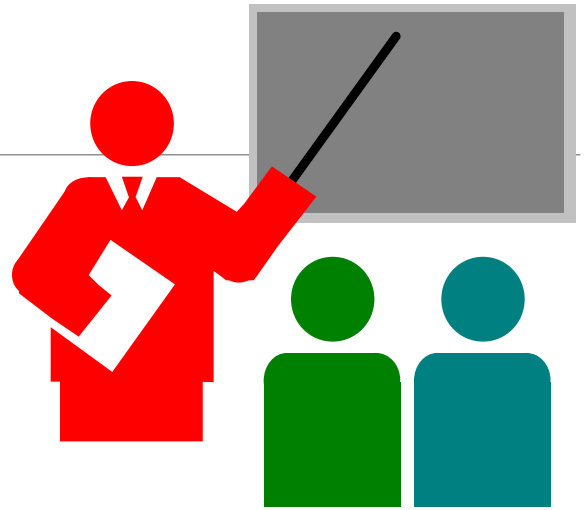
Emergency use documentation:

- Date of inspection
- Name of inspector
- Inspection findings, any action required
- Serial number or other I.D. of respirator
- Retain information
- Tags are acceptable

Breathing Air Quality

- Requirements written into standard
- Type 1-Grade D - ANSI/CGA *Commodity Specification for Air*, G-7.1-1989
- Cylinder requirements
- Compressor requirements
  - sorbent beds and filters
  - tag (date of change and signature)
  - non-oil lubricated - carbon monoxide (CO) content
  - oil-lubricated -high temperature or CO alarm or both

Training and Information

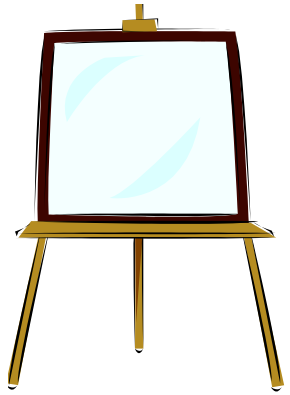


- Must provide effective training
- Required prior to use.
- Retraining required annually and when
  - workplace conditions change
  - new types of respirators are used
  - inadequacies in employee's knowledge or use indicates need
- Provide Appendix D advisory information for comfort respirator users – Posting App D not considered adequate by OSHA/MIOSHA

Training and Information -

The employer shall ensure the employee can demonstrate:

- Why the respirator is necessary and how improper fit, use, or maintenance can compromise the protective effect of the respirator
- Limitations and capabilities
- Use in emergency situations
- How to inspect, put on and remove, use and check the seals
- Procedures for maintenance and storage
- Recognition of medical signs and symptoms that may limit or prevent effective use
- General requirements of the standard



Program Evaluation

- Conducted as necessary
- Regularly consult employees
- Assess:
  - Type/extent of existing hazards
  - Types of respirators used
  - Number of employees using resp.
  - Experience of respirator wearers
  - Respirator fit
  - Appropriate selection
  - Proper use
  - Proper maintenance

Recordkeeping

- Medical evaluations - duration of employment plus 30 years
- Fit test - until the next fit test
- Written copy of current program

Appendices

▪Appendix A	Fit Testing Procedures
▪Appendix B - 1	User Seal Check Procedures
▪Appendix B - 2	Respirator Cleaning Procedures
▪Appendix C	OSHA Respirator Medical Evaluation Questionnaire
▪Appendix D	Information for Employees Using Respirators When Not Required Under the Standard

MIOSHA Website

www.mi.gov/miosha

A to Z Topic Index:

Select “R” for Respiratory Protection

Additional Resources

- MIOSHA: Sample Written Respiratory Protection Program
- OSHA: Small Entity Compliance Guide
- NIOSH:
  - Healthcare Respiratory Protection Resources
  - Recommendations for the Selection and Use of Respirators and Protective Clothing for Protection Against Biological Agents
- CDC: Preparation and Planning for Bioterrorism Emergencies

Additional Assistance

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For further information or to request consultation, education and training services, call 517-284-7720 or visit our website at www.michigan.gov/miosha