

Respiratory protection

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Minnesota Department of Labor and Industry

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OSHA's Respiratory Protection Standard 29 CFR 1910.134

- This standard applies to general industry (Part 1910), shipyards (Part 1915), marine terminals (Part 1917), longshoring (Part 1918) and construction (Part 1926).
- The standard became effective April 8, 1998.

Respiratory protection use

- Respiratory protection: With proper selection, respiratory protection can be used to control breathing air contaminated with harmful levels of:
 - dust;
 - fumes;
 - mists;
 - vapors; and
 - gases.
- With proper selection, they may also be used to protect against oxygen-deficient atmospheres.

When does OSHA require the use of respiratory protection?

- When an employee is exposed to an air contaminant at a level exceeding applicable permissible exposure limits (PELs) and:
 - (1) the employer is in the process of installing feasible engineering controls (general or local exhaust ventilation) to reduce exposure to below PELs; or
 - (2) when engineering or administrative controls are not feasible in an effort to reduce exposures to levels below applicable PELs.

When does OSHA require the use of respiratory protection?

- When MNOSHA can show an employee exposure to an air contaminant is at a hazardous level where no MNOSHA PEL exists for that air contaminant.

Example

- MNOSHA has no established PEL for 2-butoxyethyl acetate (CAS 112-07-2).
- The National Institute for Occupational Safety and Health (NIOSH) recommends a limit for employee exposure to 2-butoxyethyl acetate of 5 ppm as a TWA.

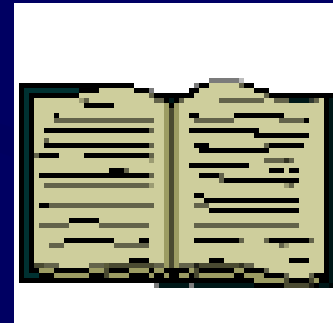
Format of the respiratory protection standard

- (a) Permissible practice
- (b) Definitions
- (c) Respirator program
- (d) Selection of respirators
- (e) Medical evaluation
- (f) Fit testing
- (g) Use of respirators
- (h) Maintenance and care
- (i) Breathing air quality and use
- (j) Identification of filters, cartridges and canisters
- (k) Training and information
- (l) Program evaluation
- (m) Recordkeeping
- (n) Dates
- (o) Appendices (mandatory)
 - A: Fit-testing procedures
 - B-1: User seal checks
 - B-2: Cleaning procedures
 - C: Medical questionnaire
 - D: Information for employees wearing respirators when not required under the standard

29 CFR 1910.134(c)

Written respiratory protection program must address:

- procedures for respirator selection;
- medical evaluation provisions;
- fit-testing procedures;
- usage procedures;
- cleaning procedures and schedules; and
- procedures to ensure adequate air quality.



29 CFR 1910.134(c)

Written respiratory protection program must address (continued):

- training about the respiratory hazards to which employees are potentially exposed;
- training about the proper use and care of the provided respirators; and
- evaluation procedures to ensure effectiveness of the program.

Note: Additional procedures may be necessary in any immediately dangerous to life or health (IDLH) environment.

29 CFR 1910.134(c)

Written respiratory protection program

Federal OSHA has a written guideline for developing a respiratory protection program:

*Small entity compliance guide
for the revised
respiratory protection standard*



It is available on the federal OSHA website at www.osha.gov and contains a sample written program in its appendices.

A written respiratory protection program addressing all elements is required:

- when a respirator is being used by an employee to provide protection against an air contaminant level exceeding the PEL, an oxygen-deficient atmosphere or an IDLH exposure level; or
- when the employer has mandated respirator use by an employee, regardless of the employee's exposure level to the conditions above.

Voluntary use of respirators

29 CFR 1910.134(c)(2)

- When an employee is provided a respirator to use by the employer or is allowed to bring in his/her own respirator to use and the use is not required to protect against an exposure exceeding the PEL nor has the employer mandated the use of a respirator, the employer is required to:

(1) provide the employee voluntarily using the respirator with the information contained in Appendix D of the Respiratory Protection Standard (29 CFR 1910.134); and

Voluntary use of respirators

29 CFR 1910.134(c)(2) (continued)

(2) establish and implement those elements of a written respiratory protection program that will ensure the employee using the respirator voluntarily is medically able to use that respirator; and

(3) ensure the respirator is cleaned, stored and maintained so its use does not present a health hazard to the user.

Exception: Employers are not required to include in a written respiratory protection program those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks).

Selection of respirators, general requirements – 29 CFR 1910.134(d)(1)

- The respirator must be appropriate for the hazard(s) the wearer will encounter.
- It must be NIOSH-certified.
- The employer shall evaluate the respiratory hazards in the workplace, including a reasonable estimate of the level of exposure of the employee, the chemical state and physical form. If that's not possible, the employer shall consider the atmosphere IDLH.
- The respirator must be selected from a sufficient number of models and sizes so it is acceptable to – and correctly fits – the user.

Selection of respirators for IDLH atmospheres – 29 CFR 1910.134(d)(2)

- Full facepiece pressure demand self-contained breathing apparatus (SCBA) certified by NIOSH for a minimum service life of 30 minutes.
- Or a combination full facepiece pressure demand supplied air respirator (SAR) with auxiliary self-contained air supply.

Note: Oxygen-deficient atmospheres shall be considered IDLH.

Self-contained
breathing
apparatus
(SCBA)



Combination full
facepiece
pressure demand
supplied air
respirator (SAR)
with auxiliary
self-contained air
supply



Selection of respirators for atmospheres that are not IDLH – 29 CFR 1910.134(d)(3)(i) and (ii)

- The employer shall provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements.
- The respirator shall be appropriate for the chemical state and physical form of the contaminant.

Selection of respirators for protection
against gases and vapors in atmospheres
that are not IDLH –
29 CFR 1910.134(d)(3)(iii)(A)

Atmosphere-
supplying
respirator
(See manufacturer's
information for
protection factors.)



Selection of respirators for protection
against gases and vapors in atmospheres
that are not IDLH –
29 CFR 1910.134(d)(3)(iii)(B)

Air-purifying
respirator
with cartridges
or canisters
approved for the
contaminant



Half-mask
(to 10X PEL)



Full face-mask
(to 50X PEL)

Selection of respirators for protection against gases and vapors in atmospheres that are not IDLH – 29 CFR 1910.134(d)(3)(iii)(B)(1)



The respirator or cartridge must have an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant of concern; or

Selection of respirators for protection against gases and vapors in atmospheres that are not IDLH –

29 CFR 1910.134(d)(3)(iii)(B)(2)

... if there is no ESLI appropriate for conditions, the employer must implement a change schedule for canisters and cartridges, based upon objective information or data that will ensure canisters or cartridges are changed before the end of their service life, and include that information or data in the written respiratory protection program. The employer may want to enlist the assistance of the manufacturer of the respirator to make the determination of cartridge or canister service life.

Selection of respirators for protection
against particulates in atmospheres that are
not IDLH –

29 CFR 1910.134(d)(3)(iv)(A)

Atmosphere-
supplying
respirator

(See manufacturer's
information for
protection factors.)



Selection of respirators for protection
against particulates in atmospheres that
are not IDLH –

29 CFR 1910.134(d)(3)(iv)(B)

An air-purifying
respirator with a filter
certified by NIOSH under
30 CFR Part 11 as a high-
efficiency filter; or

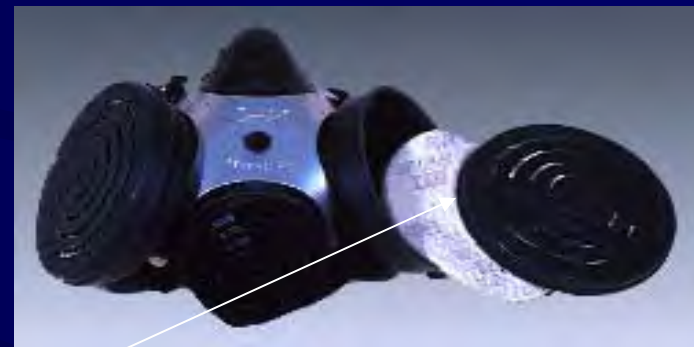


Half-mask with P 100 filter
(to 10X PEL)

Selection of respirators for protection against particulates in atmospheres that are not IDLH –

29 CFR 1910.134(d)(3)(iv)(B)

... air-purifying
respirator
equipped with a
filter certified for
particulates by
NIOSH under 42
CFR Part 84.



Filtering facepiece respirators

A negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium



Filtering facepiece (dust mask)
(to 10X PEL)

Particulate filter ratings

Alphabetic designation:

N	=	not oil resistant
R	=	oil resistant
P	=	oil proof

Numeric designation:

95	=	95% efficient in filtering particulate of 0.3 microns in size
99	=	99% efficient in filtering particulate of 0.3 microns in size
100	=	99.97% efficient in filtering particulate of 0.3 microns in size (HEPA rating)

Particulate filter ratings

Oil
resistance

N

R

P

Filter
efficiency

95

N 95

R 95

P 95

99

N 99

R 99

P 99

100

N 100

R 100

P 100

	N	R	P
95	N 95	R 95	P 95
99	N 99	R 99	P 99
100	N 100	R 100	P 100

Medical evaluations

29 CFR 1910.134(e)

- The employer must provide for a medical evaluation to determine the employee's ability to use the respirator while performing the work activity in the workplace conditions, before fit-testing is conducted and the respirator is to be used.
- The employer must identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information.

Medical evaluations (continued)

29 CFR 1910.134(e)

- The medical evaluation must obtain the information requested by the questionnaire in Sections 1 and 2, Part A of Appendix C of 29 CFR 1910.134.
- A follow-up medical examination is required for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C, or whose initial medical examination demonstrates the need for a follow-up medical examination.

Medical evaluations (continued)

29 CFR 1910.134(e)

- At a minimum, the employer must provide additional medical evaluations if:
 - the employee reports medical signs or symptoms related to the ability to use a respirator;
 - a PLHCP, supervisor or program administrator informs the employer that an employee needs to be re-evaluated;
 - information from the respirator program, including observations made during fit-testing and program evaluation, indicates a need; or
 - changes occur in workplace conditions that may substantially increase the physiological burden on an employee.

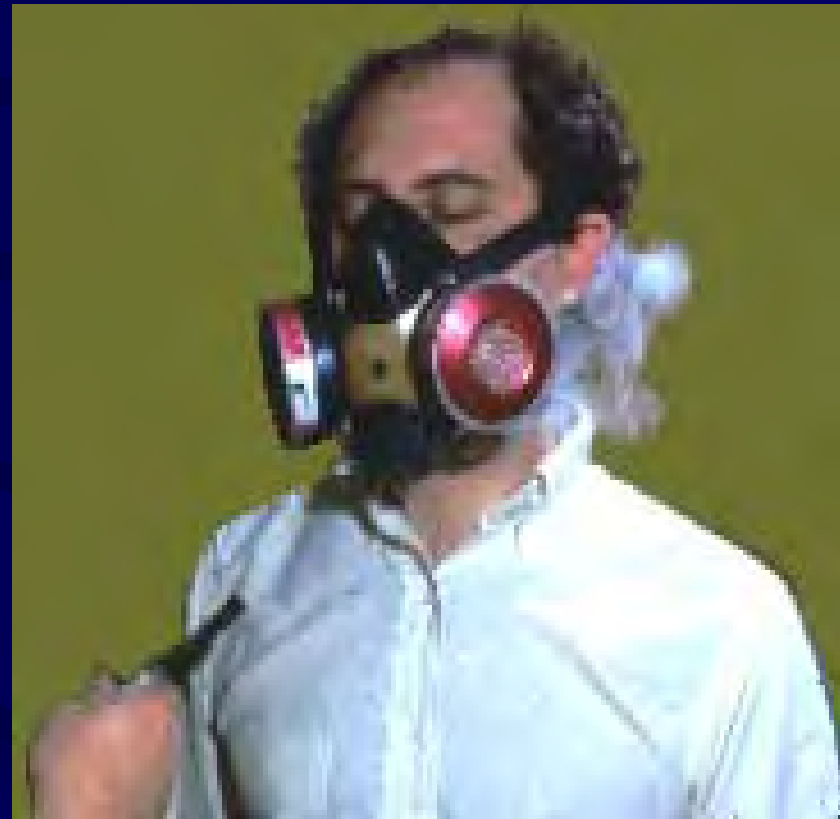
Fit-testing

29 CFR 1910.134(f)

- Employees using tight-fitting facepiece respirators must pass an appropriate qualitative fit-test (QLFT) or quantitative fit-test (QNFT):
 - prior to initial use;
 - whenever a different respirator facepiece (size, style, model or make) is used; and
 - at least annually thereafter.
- Facial hair in the area where the respirator seals against the face is not allowed. It will cause failure in the fit test.
- The employee should also wear any PPE, such as safety glasses, that could interfere with the fit.

Qualitative fit-testing (QLFT)

- A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to a test agent.
- The fit-test must be administered using an OSHA-accepted QLFT contained in Appendix A of 29 CFR 1910.134.
- QLFT protocols:
 - isoamyl acetate (odor = banana oil);
 - saccharin (taste = sweet);
 - Bitrex (taste = bitter); and
 - irritant smoke (irritant to respiratory tract).



Qualitative fit-testing (QLFT)

- Qualitative fit-testing:
 - is only for negative pressure air-purifying respirators that must achieve a fit factor of 100 or less. This means QLFT cannot be used where atmospheres are > 10 times the PEL.
 - is typically done in a hood.
 - the employee goes through a variety of exercises to:
 - confirm adequate fit; and
 - confirm proper use.

Quantitative fit-testing (QNFT)

- An assessment of the adequacy of the respirator fit by numerically measuring the amount of leakage into the respirator.
- It determines a fit factor, a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio:

Concentration of a substance in ambient air
Concentration inside the respirator when worn



Quantitative fit-testing (QNFT)

- A QNFT must be administered using an OSHA-accepted QNFT protocol contained in Appendix A of 29 CFR 1910.134.

QNFT protocols:

- generated aerosol (corn oil, salt, DEHP);
- condensation nuclei counter (PortaCount); and
- controlled negative pressure (Dynatech FitTester 3000).

Use of respirators

29 CFR 1910.134(g)(1)

- Respirators with tight-fitting facepieces must not be worn by employees who have facial hair or any condition that interferes with the face-to-facepiece seal or valve function.
- Corrective glasses or goggles and other PPE must be worn in a manner that does not interfere with the face-to-facepiece seal.
- Employees wearing tight-fitting respirators must perform a user seal check each time they put on the respirator using the procedures in Appendix B-1 or equally effective manufacturer's procedures.



Use of respirators

29 CFR 1910.134(g)(2)

To ensure continuing respirator effectiveness:

- the employer must maintain appropriate surveillance of work area conditions and degree of exposure or stress, and re-evaluate the respirator's effectiveness when it may be affected by any changes.
- the employees must leave the respirator use area:
 - to wash their faces and respirator facepieces as necessary;
 - if they detect vapor or gas breakthrough, changes in breathing resistance or leakage of the facepiece; and
 - to replace the respirator or filter, cartridge, or canister.
- if an employee detects vapor or gas breakthrough, changes in breathing resistance or leakage of the facepiece, the employer must replace or repair the respirator before allowing the employee to return to the work area.

Use of respirators (in IDLH atmospheres)

29 CFR 1910.134(g)(3)

- One employee or – when needed – more than one employee must be located outside the IDLH atmosphere.
- Visual, voice or signal line communication must be maintained between employees inside and outside.
- Employees located outside must be trained and equipped to provide effective emergency rescue.
- Employer or authorized designee must be notified before any employee outside the IDLH atmosphere enters to provide emergency rescue.
- The employer or authorized designee, once notified, must provide necessary assistance appropriate to the situation.

Use of respirators (in IDLH atmospheres)

29 CFR 1910.134(g)(3)

- Employees located outside the IDLH atmosphere must be equipped with a pressure demand or other positive pressure SCBA or SAR with auxiliary SCBA and either:
 - appropriate retrieval equipment for removing employees who enter, where retrieval equipment would contribute to the rescue of employees and would not increase the overall risk resulting from entry; or
 - equivalent means for rescue where retrieval equipment is not required per above.

Use of respirators (interior structural firefighting) 29 CFR 1910.134(g)(4)

In addition to the procedures for respirator use in IDLH atmospheres, in interior structural fires:

- at least two employees must enter and remain in visual or voice contact with one another at all times;
- at least two employees must be located outside;
- all employees engaged in interior structural firefighting must use SCBAs;
- one employee located outside may be assigned an additional role (e.g., incident commander), as long as this doesn't interfere with their assistance or rescue activities; and
- this standard does not preclude firefighters from performing emergency rescue before an entire team has assembled.

Maintenance and care of respirators

29 CFR 1910.134(h)(1)

- Provide each user with a respirator that is clean, sanitary and in good working order.
- Use procedures in Appendix B-2 or equivalent manufacturer's recommendations.
- Clean and disinfect at the following intervals:
 - as often as necessary when issued for exclusive use;
 - before being worn by different individuals when issued to more than one employee; and
 - after each use for emergency respirators and those used in fit-testing and training.



Maintenance and care of respirators

29 CFR 1910.134(h)(2)

- Storage of respirators:
 - stored to protect from damage;
 - stored to protect from contamination, dust, sunlight, extreme temperatures, excessive moisture and damaging chemicals;
 - stored to prevent deformation of facepiece and valves.
- Emergency respirators must also be:
 - kept accessible to the work area;
 - stored in compartments or in covers that are clearly marked as containing emergency respirators; and
 - stored in accordance with the manufacturer's instructions.

Maintenance and care of respirators

29 CFR 1910.134(h)(3)

- Inspection:
 - for routine use, before each use and during cleaning;
 - emergency respirators, monthly and in accordance with manufacturer's recommendations;
 - emergency escape-only respirators, before being carried into the workplace for use.
- Inspections must include:
 - respirator function;
 - tightness of connections;
 - condition of components; and
 - a check of elastomeric parts for pliability or deterioration.

Maintenance and care of respirators

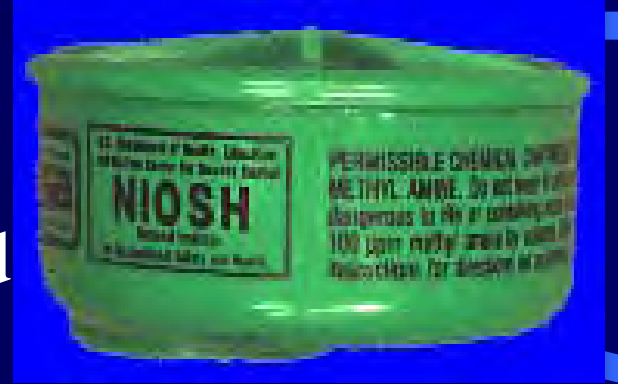
29 CFR 1910.134(h)(4)

- Repair of respirators:
 - if failing an inspection or otherwise found to be defective, respirators must be discarded or repaired;
 - repairs can only be made by trained individuals using the respirator manufacturer's NIOSH-approved parts; and
 - repairs must meet manufacturer's recommendations and specifications.

Identification of filters, cartridges and canisters

29 CFR 1910.134(j)

- All filters, cartridges and canisters used in the workplace must be labeled and color-coded with the NIOSH approval label.
- The label must not be removed and must remain legible.
- “TC number” is no longer on cartridges or filters (Part 84).
- Marked with “NIOSH,” manufacturer’s name and part number, and an abbreviation to indicate cartridge or filter type (e.g., N95, P100, etc.).



Training and information

29 CFR 1910.134(k)

- Employees who are required to use respirators must be trained so they can demonstrate knowledge of at least:
 - why the respirator is necessary and how improper fit, use or maintenance can compromise its protective effect;
 - the limitations and capabilities of the respirator;
 - the effective use in emergency situations;
 - how to inspect, put on and remove, use and check the seals;
 - proper maintenance and storage;
 - recognition of medical signs and symptoms that may limit or prevent effective use; and
 - general requirements of this standard.

Training and information

29 CFR 1910.134(k)

- Training must be provided prior to use, unless acceptable training has been provided by another employer within the past 12 months.
- Retraining is required annually and when:
 - changes in the workplace or type of respirator render previous training obsolete;
 - there are inadequacies in the employee's knowledge or use; and
 - any other situation arises in which retraining appears necessary.
- The basic advisory information in Appendix D must be provided to employees who wear respirators when use is not required by this standard or by the employer (i.e., voluntary use of respirators).

Program evaluation

29 CFR 1910.134(1)

- The employer must conduct evaluations of the workplace as necessary to ensure effective implementation of the program.
- The employer must regularly consult employees required to use respirators to assess their views on program effectiveness and to identify and correct any problems.

Factors to be assessed include:

- respirator fit (including effect on workplace performance);
- appropriate selection;
- proper use; and
- proper maintenance.

Recordkeeping

29 CFR 1910.134(m)

- Records of medical evaluations must be retained and made available as stated in 29 CFR 1910.1020.
- A record of fit-tests must be established and retained until the next fit-test is administered.
- A written copy of the current program must be retained.
- Written materials required to be retained must be made available upon request to affected employees and OSHA.

Dates

29 CFR 1910.134(n)

- This standard became effective April 8, 1998.
- Employers must meet all requirements set forth in this standard.

Appendices

29 CFR 1910.134(o)

Appendices

A: Fit-testing procedures

B-1: User seal checks

B-2: Cleaning procedures

C: Medical questionnaire

D: Information for employees wearing respirators when not required under the standard

Compliance with Appendix A, Appendix B-1, Appendix B-2 and Appendix C are mandatory. Appendix D of this section is nonmandatory.

Questions?

