

Respirator Program

Respirators are widely used in industry to reduce worker exposure to airborne inhalation hazards. They can be an effective method of controlling worker exposure to air contaminants that pose an inhalation hazard.

Unfortunately, respirator use often occurs without the preparation necessary to ensure that they will be effective and safe.

When used improperly, respirators will provide a false sense of security for the worker and may put the user at a serious health risk. A respirator must be used in conjunction with an effective *Respirator Program* to ensure that it provides effective protection for the worker.

The *Respirator Program* should be a part of an integrated hazardous materials control strategy that determines the best control method for a given situation. Respirators are used to control exposures to air contaminants only if other control methods (i.e., engineering or work practice controls) are not feasible.

As a control method for inhalation hazards, respirators are the least effective and hardest to properly maintain. Respirators, as a control measure, do not prevent air contaminants from entering the general atmosphere, making it more difficult to control and resulting in potential exposures to other workers. Respirators should only be used under the following three conditions:

1. For emergency situations.
2. During implementation of other control methods.
3. When other control measures are not possible given the work conditions.

The *Respirator Program* should be *written*, beginning with a statement of the program's purpose and the scope. These two elements establish the basis for program development and later guide program evaluation. Program development, implementation, and evaluation need to be conducted in close consultation with the Joint Workplace Health and Safety Committee or the Workplace Health and Safety Representative. Also, designating a program administrator facilitates program continuity and accountability.

A *Respirator Program* spells out responsibilities, decision criteria, policies, and specific procedures as they apply to the eight program components. The written program needs to be readily accessible to all employees.

These components follow a logical sequence and should be implemented in the order listed. For example, respirator fit-testing takes place after the hazard evaluation, respirator selection and medical certification. Each component is introduced below.

1. Hazard Evaluation

The purpose of this component is to determine the nature of the hazard so that the correct respirator can be selected. Information needed includes the chemical(s)

identity, potential health hazards (not just respiratory hazards), routes of entry, airborne concentration, and work environment stresses.

2. Respirator Selection

Respirator selection is based on the hazard evaluation information.

Factors which determine respirator selection include:

- oxygen deficient atmosphere
- chemical identity and properties
- physical forms(s)
 - gas/vapour
 - particulate
- air concentration
- Immediate Danger to Life or Health (IDLH) conditions.
- respirator Assigned Protection Factor (APF)
- chemical warning properties (the ability to smell, taste, or otherwise detect the contaminant inside the respirator)
- other health hazards

3. Medical Certification

Respirator use puts stress on the pulmonary (breathing) and cardiovascular (heart) body systems. Consequently, it is important for a physician to determine if a potential respirator wearer's health could be impaired by using a respirator.

Frequently included in the medical exam is a lung function test (spirometry). Other tests are done as determined by the physician. The physician, in determining a worker's fitness to wear a respirator, must take into account for the hazard, the proposed respirator, and work environment stresses.

If vision correction is needed while wearing a respirator, restrictions may be placed on the use of contact lenses because dust particles or chemical vapours may be trapped by the lens. Special accommodation is needed to wear eyeglasses with a full-face piece respirator.

On completion of the exam, the physician certifies in writing whether the worker is eligible to wear a given respirator under the specified conditions and lists any restrictions on respirator use. No other medical information is to be released.

4. Respirator Fit

Now the worker is ready to be fitted with the appropriate respirator. Different makes, models, and sizes need to be available as no one respirator fits all workers. A respirator fit test is conducted once a worker has properly donned the respirator, checked for any obvious leaks in the respirator face seal (negative and positive pressure fit-checks), and worn the respirator for a few minutes.

Components of a Respirator Program

1. Hazard Evaluation
2. Respirator Selection
3. Medical Certification
4. Respirator Fit
5. Cleaning/Maintenance/Storage
6. Training
7. Records
8. Program Evaluation

The fit test is conducted while the wearer performs a series of exercises, including breathing, deep breathing, moving their head and talking. There are two types of fit tests, quantitative and qualitative. The *quantitative fit test* measures the test substance concentration inside and outside the respirator and gives a numerical value of fit. The *qualitative fit test* relies on the respirator wearer to detect (by taste, smell, or feel) the test substance inside the respirator indicating a leak and an unacceptable fit.

5. Cleaning/Maintenance/Storage

Proper respirator cleaning, maintenance, and storage is essential to ensure that the respirator will function properly when needed. Respirators need to be dismantled, cleaned with a disinfectant that will not degrade the respirator, rinsed, and dried in a clean atmosphere. Maintenance requires regular inspection of the face piece, exhalation valves, and straps for wear and defects. Respirators need to be stored in a cool, dry, and clean location free from contaminants. Air-purifying respirators at the work site need to be stored in a sealed plastic bag. Otherwise the inside of the respirator may become contaminated and the chemical cartridges may continue to absorb chemicals, shortening the service life. Supply-air respirators and powered air-purifying respirators have additional cleaning, maintenance, and storage requirements.

6. Training

Training is the key to a successful program. All workers, supervisors and management involved need to receive training relevant to their roles to ensure acceptance and cooperation. Training takes place before the respirator is used in a contaminated atmosphere, and a refresher course is given on an annual basis. Training is also needed for new or transferred employees before they use a respirator.

The training should be respirator and workplace specific, addressing all the components of the *Respirator Program*.

Training topics include:

1. Nature, extent and health effects of the hazard.
2. Why the respirator is needed and other control measures are not being used.
3. The warning properties of the air contaminant.
4. The respirator
 - selection criteria
 - operation, capabilities and limitations
 - cartridge service life
5. Instruction and practice for inspection, donning and fit checking respirators.
6. Opportunity to wear the respirator in both safe and contaminated atmospheres.
7. Emergency situations.
8. Maintenance and storage.
9. Regulatory requirements.
10. Content and location of the written program.
11. Responsibilities.

Upon completion of the training, respirator wearers need sufficient practice to be comfortable using the respirator while conducting their work duties.

7. Records

Written records need to be maintained regarding the hazard evaluation, respirator selection, medical certification, fit testing, and training.

8. Program Evaluation

A program evaluation needs to be conducted on a regular basis. This includes determining

- Worker acceptance.
- Program compliance at all levels.
- If the program purpose and expected hazard reduction is met.
- If any changes have taken place that require program modification.

Other Considerations

Beards. Respirators with a tight face respirator seal cannot be worn with facial hair that interferes with the seal. Respirator users need to be clean shaven. (Some moustaches are acceptable.) Prior to implementing the program, a policy is needed to address workers currently wearing beards who will be using a respirator.

Communication. Respirators can interfere with verbal communication in some work environments. Alternative communication methods such as respirator speaking diaphragms may be needed. Respirators are not to be removed in a contaminated atmosphere when speaking.

Temperature extremes. Extreme temperatures may interfere with respirator performance. At low temperatures, a full-face respirator may fog, exhalation valves may freeze and supply-air pressure connectors may leak. Face pieces may stiffen and distort when stored at low temperatures. At high temperatures there is additional stress on the wearer and breathing air may need cooling. Storage at extreme temperatures may distort face pieces and accelerate face piece degradation.

Employees unable to wear respirator. A policy is needed to accommodate workers unable to wear respirators prior to implementation of the program.

A *Respirator Program* should be based on the *Canadian Standards Association (CSA) Standard Z94.4-93 Selection, Use and Care of Respirators (1993)*.

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