

# Workplace Health and Safety Bulletin



## Medical Assessment of Fitness to Wear a Respirator

### Purpose

This Medical Guideline is designed to help physicians and other occupational health and safety professionals determine if a worker is medically fit to use a respirator.

A number of medical conditions may preclude respirator use, especially for extended periods of continuous use. Emergency or short term use may be acceptable for some workers with these conditions, but their suitability should be carefully assessed on an individual basis in consultation with safety personnel and supervisors.

### Respirators

Respirators are available in a variety of models and functions. Each type of respirator is designed for use under specific environmental conditions and is appropriate for only a certain class or type of respiratory hazard.

The basic types of respirator, the criteria for their use, and applicable regulatory requirements are explained in



[http://employment.alberta.ca/documents/WHS/WHS-PUB\\_ppe001.pdf](http://employment.alberta.ca/documents/WHS/WHS-PUB_ppe001.pdf)  
Respiratory Protective Equipment: An Employer's Guide

---

Each type of respirator is designed for use under specific environmental conditions and is appropriate for only a certain class or type of respiratory hazard.

---



# Physical demands of respirator use

Respirator use can sometimes be quite physically demanding for the average worker. These demands, described below, form the basis for the medical assessment.

---

Respirator use can sometimes be quite physically demanding for the average worker.

---

## Increased resistance while breathing

Respirators that use filters to prevent particulates or gases from being inhaled can increase the work of breathing during inhalation by up to 85 mm of water pressure. As the filters become fouled during use, resistance to breathing increases. Expiratory effort is not as significantly affected by these respirators.

In contrast, air-supplied positive pressure respirators may require increased expiratory effort, as the user must breathe out against air pressure that is greater than normal. The extra respiratory effort increases as the rate of breathing increases with work activity. Table 1 indicates the volumes of air that must be moved by an individual at different work intensities.

Table 1 Respired volume of air for different work intensities

Task	Respired Volume (l/min)
Light Work	6-15
Moderate Work	15-25
Heavy Work	25-40
Very Heavy Work	40-60
Extremely Heavy Work	60-90
Exhaustive Work	90-120

## Physical load

Small filter-type respirators place very little physical demand on the worker, but some respirators are extremely bulky and heavy. A self-contained breathing apparatus is heavy and can limit or restrict movement in confined areas.

Air-line respirators have the disadvantage of a trailing hose, but are otherwise light and compact. Users of air-line respirators, however, often have to carry an escape bottle of air for emergency use.

Conditions requiring use of more sophisticated (and heavier) types of respirators may also involve the use of other cumbersome protective equipment such as boots, helmets, impervious suits, lines, and lamps. The demands of having to wear this additional equipment should be considered when assessing a worker's ability to use a respirator.

## Discomfort

Even the most well-designed respirator can be somewhat uncomfortable. To a large extent, this can be overcome as a worker becomes accustomed to the respirator over time. The very presence of a restrictive device over the face, especially a full facepiece, imposes an abnormal psychological and physiological burden on the worker.

In extreme cases, this restriction may produce a claustrophobic reaction. In a full facepiece, the effects of environmental temperature extremes are magnified, the wearer is unable to scratch their face or touch their eyes, facial skin is compressed, and sweat may collect under areas where the mask contacts the skin. The beard area of the male face is particularly vulnerable to irritation caused by mask wear.

---

The very presence of a restrictive device over the face, especially a full facepiece, imposes an abnormal psychological and physiological burden on the worker.

---

## Visual restrictions

Respirators that cover the entire face use eyepieces or a single "window" through which the wearer sees. Vision may be restricted by these devices in several ways. A curved lens may produce distracting reflections that can affect safety or performance accuracy. Eyepieces invariably limit visual fields and binocular vision may be difficult or impossible, especially at close range.

Wearers of multi-focal glasses are aware of the need or tendency to tilt their heads backwards when looking through the lower part of their lenses. It may be impossible with some respirators for these workers to read or perform close-up work because of the position of their eyes, glasses, and mask eyepiece. Even for the worker who doesn't wear glasses, it may be difficult or impossible to use an optical instrument while wearing a particular mask.

For those workers who normally wear glasses, corrective lenses can be incorporated directly into the facepiece of some types of respirators. Normal glasses cannot be worn with full facepiece respirators since the frames can interfere with the respirator seal at the temples.

---

For those workers who normally wear glasses, corrective lenses can be incorporated directly into the facepiece of some types of respirators.

---

## Assessing the worker

Medical assessments of workers for respirator use should be performed

- (1) during pre-placement examinations for jobs where a respirator will or may be used;
- (2) when a worker who is expected to use a respirator returns to work following major surgery or prolonged illness; and
- (3) in conjunction with regular periodic medical surveillance or health examinations.

The following information should be obtained, either by an interview or through the use of a self-administered questionnaire:

(a) **Respirator and work information**

- The type of respirator to be used.
- The airborne hazards to which the worker will be exposed.
- The extent of use e.g. hours/day, times/shift, emergency only, etc.
- A description of the types of physical activities that will be performed while wearing the respirator e.g. hands only, hands and arms, whole body, very heavy lifting, climbing, etc.
- Whether the worker has special responsibilities for the safety of others e.g. rescue worker, firefighter, security officer, etc.
- What other protective equipment will be worn or carried while the respirator is being used.

- Are there significant adverse environmental conditions in addition to the principal hazards e.g. excessive heat or cold, confined spaces, height, etc.
- Whether the worker has ever had problems with wearing or fitting a respirator.

(b) **Medical history**

- Cardiovascular disorders
- Respiratory disorders
- Skin disorders
- Neurological disorders
- Anxiety attacks
- Claustrophobia
- Joint disorders

(c) **Functional inquiry**

- Limitations or restrictions of movement or use of limbs, back, or neck.
- Problems with breathing such as breathlessness, chronic cough.
- Skin inflammation or infection, especially furunculosis, acne, contact dermatitis, and Sycosis barbae or Barber's Itch. Barber's Itch is a chronic folliculitis of the male beard area. This area is particularly prone to flare up when shaving is sufficiently close to ensure an adequate respirator seal.
- Episodes of sudden loss of consciousness.
- Visual deficiencies and use of contact lenses.
- Episodes of chest pain or irregular pulse.
- Drug, alcohol, and medication use.

---

Special attention should be given to the skin and hair of the head and face, facial contour and vision.

---

(d) **Examination**

The examination should be directed towards the system and disorders covered in the functional inquiry and medical history, plus the background information about the intended use of the respirator. Special attention should be given to the skin and hair of the head and face, facial contour, and vision. Where special tests are indicated, they should be used. For example, pulmonary function tests, audiometric tests, tests for visual acuity, etc. may be useful in particular cases.

(e) **Limiting conditions**

In general, workers who have previously used a respirator successfully, despite having one of the following conditions, will likely be able to continue using the same type of respirator unless the disorder worsens.

The following conditions should normally be considered as incompatible with the use of respirators, particularly in very hazardous or severely stressful conditions.

- (1) Any uncontrolled condition resulting in sudden loss of consciousness or the inability to function. The same criteria as those limiting heavy vehicle operation may be used.
- (2) Claustrophobia — this may be assessed by use of a field test or trial of use.
- (3) Uncontrolled anxiety attacks, manic-depressive illness, or similar affective psychological disorders.
- (4) Significant restrictive or obstructive lung disease.
- (5) Symptomatic coronary vascular disease or recent myocardial infarction.
- (6) Significant arrhythmia including paroxysmal tachycardia.
- (7) Uncontrolled hypertension.
- (8) For full facepiece respirators, active conjunctivitis or blepharitis.
- (9) Use of medications that lower the normal level of awareness, produce delusions or hallucinations, or decrease the worker's performance reliability.
- (10) Use of medications that may require emergency removal of the respirator e.g. aerosolized bronchodilators, sub-lingual medications, etc.

The following are conditions that, while not absolute contraindications, require careful individual assessment when applicable:

- (11) For full facepiece respirators, visual deficiencies that require correction for the required job to be performed safely and accurately, unless the deficiencies can be corrected by means that do not compromise the facepiece seal.
- (12) History of heat stroke.
- (13) Sycosis barbae or Barber's Itch.

- (14) History of significant cardiac or respiratory disease e.g. bypass surgery, asthma, etc.
- (15) Alcoholism or known drug abuse.
- (16) Respiratory tract infection.
- (17) History of neurological disorders such as epilepsy.
- (18) Significant hearing loss. Will the worker be required to hear instructions from a co-worker who is also wearing a respirator?

Absolute contraindications for respirator use include the following conditions.

- (19) Facial deformities e.g. deep facial scars, hollow temples, very receding chin, edentulous workers.
- (20) Facial hair that prevents a good reliable facepiece seal e.g. beard, large bulky moustache, sideburns.

**(f) Exercise stress test**

Workers who have pulmonary or cardiovascular disorders should undergo stepwise increasing submaximal exercise tests. The tests should be performed first without, and then while wearing a respirator. The heaviest exercise level in the test should exceed the workload that the worker will experience while wearing a respirator and working.

Where practical, all individuals required to use a self-contained breathing apparatus for extended periods of time while performing physically strenuous work should undergo a submaximal stress test. The results provide an indication of the individual's physical capabilities and limits while wearing the respirator. This is of value to both the assessor and the worker.

---

Where practical, all individuals required to use a self-contained breathing apparatus for extended periods of time while performing strenuous work should undergo a submaximal stress test.

---

**(g) Respirator fit testing**

Fit testing is essential for the respirator to provide protection. Prior to fit testing, the individual should be medically assessed for conditions that would prevent the person from using a respirator. The assessment should also consider conditions that may require field testing. Qualitative and quantitative fit testing methods are described in reference texts on occupational or industrial hygiene and are not discussed in this Medical Guideline.

---

Fit testing is essential for the respirator to provide protection.

---

Facepieces for all respirators are normally available in a variety of sizes to fit the majority of workers. However, it is sometimes difficult to get a tight fit with workers who have a small face or head. The fitter should ensure that jaw movements do not compromise the seal. Workers fitted when wearing lower dentures must be reminded to always wear their dentures when using their respirator.

If glasses will be worn while the respirator is being used, the fitter should ensure that the worker can see well enough to perform their work and the glasses do not interfere with the seal. The most common location for the seal to break is in the temple area where the temple bars of the glasses may contact the facepiece. Some respirators permit prescription lenses to be mounted just inside the respirator's eyepieces.

Close attention must be paid to worker comfort. Wearing an uncomfortable mask for a long period of time can become intolerable. If prolonged wearing of a respirator is a work requirement, a time duration assessment should be included as part of the fit testing procedure. Although time consuming, it may save embarrassment, inefficiency, and the worker's life, when the worker is exposed to a hostile environment. Following such an assessment, the worker should be questioned and examined for signs of sensitivity to the facepiece material.

---

Wearing an uncomfortable mask for a long period of time can become intolerable.

---

Respirator fit testing provides an excellent opportunity for the fitter to emphasize the importance of regularly inspecting, cleaning and maintaining the equipment.

## Reporting the results

When reporting assessment results, the following or similar system of classification is recommended:

- (1) No restrictions on respirator use.
- (2) Respirator use recommended with the following restrictions: (List the restrictions and state whether they are temporary or permanent).
- (3) No respirator use under any circumstances.

## For more information

 [http://employment.alberta.ca/documents/WHS/WHS-PUB\\_ppe001.pdf](http://employment.alberta.ca/documents/WHS/WHS-PUB_ppe001.pdf)  
Respiratory Protective Equipment: An Employer's Guide

---

## Contact us:

---

### Province-Wide Contact Centre

 Edmonton & surrounding area:  
(780) 415-8690

 Throughout Alberta:  
1-866-415-8690

 Deaf or hearing impaired

- In Edmonton: (780) 427-9999

or

- 1-800-232-7215 throughout Alberta

### Web Site

 [www.worksafely.org](http://www.worksafely.org)

## Getting copies of OHS Act, Regulation & Code:

---

### Queen's Printer

 [www.qp.gov.ab.ca](http://www.qp.gov.ab.ca)

 Edmonton (780) 427-4952

### Workplace Health and Safety

 <http://industry.alberta.ca/whs-ohs>

Call any Government of Alberta office toll-free  
Dial 310-0000, then the area code and telephone number you want to reach

© 2008-2009, Government of Alberta, Employment and Immigration

This material may be used, reproduced, stored or transmitted for non-commercial purposes. The source of this material must be acknowledged when publishing or issuing it to others. This material is not to be used, reproduced, stored or transmitted for commercial purposes without written permission from the Government of Alberta, Employment and Immigration. This material is to be used for information purposes only no warranty express or implied is given as to the accuracy or the timeliness of the material presented. In case of any inconsistency between this document and the Occupational Health and Safety Legislation, the legislation will always prevail.