

IMPORTANT HSE TOPICS

RESPIRATORY PROTECTIVE EQUIPMENT

What is Respiratory Protective Equipment (RPE)?

- » RPE is specially designed equipment that is worn over the mouth and nose (or sometimes a larger part of the body such as the head) to help protect against breathing in harmful substances such as dusts, fumes and gases. There are two main types:
 - Respirators work by filtering the air as you breathe it in. They should not be worn in oxygen deficient areas or areas where the filtered air may still be dangerous. The acceptable concentration of oxygen is 19.5 – 22%.
 - Breathing apparatus supplies breathable air from an independent source to the wearer.

Selection of Respiratory Protection Equipment

- » RPE should be suitable for the substance being used, the task and the wearer. When possible you should ask your safety equipment supplier or a qualified industrial hygienist for help in choosing the correct RPE. Use Appendix A to gather the information required by your supplier or industrial hygienist to help you select the appropriate RPE.
- » Only use NIOSH approved RPE. Cheap unapproved masks and home-made RPE such as a scarf or handkerchief do not work. Look for the NIOSH approval stamp on the filter or cartridge; if it's not there it's not approved.

Suitability of Substance

- » You must select RPE with a filter designed to protect you against the substance you are exposed to. For example, a dust filter will not protect against the hydrocarbon vapors coming from a condensate tank. A hydrocarbon vapor filter will not protect against hydrogen sulfide (H₂S).
- » You will have to be especially careful when selecting filters to protect you against gases and vapors as some of these only work for a small range of substances.

Suitability for Task

- » You must ensure that the RPE is able to reduce the contamination in the air you breathe to a safe level. The amount of work the filter has to do is called its protection factor. A filter with a protection factor of 10 is able to reduce the concentration of hazardous material in the air you breathe to one tenth of the concentration outside of the RPE. Different types of RPE have different protection factors.
- » Filters will only work for a limited time. You will need to check with the supplier or in the instructions to find out how long you can wear the RPE before the filter needs changing.
- » Only wear disposable RPE once.

Suitability for Wearer

- » Several types of RPE, especially those that only fit onto the front of your face need to make good contact with your skin to work. If you have a beard or are not clean shaven they will not work and you may have to use another type of RPE such as one that covers all of your head.
- » If you wear glasses or need to wear hearing protection or a hard hat, you should check that they do not interfere or get between the RPE and your skin.
- » Employers need to provide RPE fit testing by a competent person. If you have a pre-existing medical condition you may also be required to see a doctor to determine if you are able to wear a respirator.
- » Different sizes of RPE are available. Different people will need different sizes or shapes of masks to work efficiently for them. Size and manufacturer selection is usually done as part of the fit testing process.



Figure 1: Negative Pressure Seal Test



Figure 2: Positive Pressure Seal Test

- » Users should check that an RPE mask seals well every time they put it on. To check, put it on, cover the filter and breathe in. The mask should suck down and stay there for ten seconds whilst you hold your breath (see Figure 1). If it doesn't, check it is fitted correctly and try again. Also check for leakage by covering the exhalation valve and breathing out (see Figure 2) to see if air leaks around the edge of the mask. If it does check the fit and try again.
- » If you need to wear RPE for a job, keep it on all the time. Even if you only take it off for a few seconds to speak, it will seriously reduce the protection it provides.

Maintenance

- » If your RPE has a replaceable filter, ensure that it is changed regularly before its workable life runs out.
- » Reusable RPE requires cleaning with warm soapy water after each use.
- » Check straps, face piece and seals for signs of deterioration. Replace if there are signs of damage or hardening.

Storage

- » Store your RPE in a clean location where it won't get damaged
- » Store rubber based RPE out of direct sunlight as it will shorten its usable life.

Training and Supervision Employer responsibilities

- » Gather and provide safety data sheets on the chemicals that will be present at the workplace
- » Consider elimination or substitution for a less hazardous substance (e.g., a drilling or well servicing fluid that is water based).
- » Use the Controlling Chemical Hazards guideline or web project to define the proper chemical management for the work you wish completed.
- » Develop a RPE Code of Practice/Program that complies with CSA Standard Z94.4-02: Selection, Use and Care of Respirators. Use Appendix A to gather information needed to select RPE.
- » Ensure supplied breathing air quality complied with CSA Standard Z180.1: Compressed Breathing Air and Systems.
- » Provide fit testing and RPE training for workers.

Supervisor responsibilities

- » Ensure the availability of the required Guidance Sheets for chemical management.
- » Designate an area for storing, putting on and taking off RPE. Clean this area regularly.
- » Ensure workers have been fit tested and trained on RPE use.
- » Ensure the availability of appropriate respirators in all sizes and appropriate replacement filters and cartridges. Inspect RPE regularly.

Worker responsibilities

- » Ensure that you are taught or shown: how to fit the RPE correctly, how to check for a face seal, how often to change the filter and how to check, maintain and store your RPE.
- » Only use 'single use' RPE once;
- » Keep your face clean shaven if required to use RPE.

EMPLOYEE CHECKLIST

- Ensure face is clean shaven.
- Ensure other safety equipment (e.g. goggles) does not interfere with RPE seal.
- Ensure RPE is inspected, is clean and is free from damage before use.
- Perform a seal test before each RPE use.
- Ensure that RPE is appropriate for the work you are doing.
- Ensure air contains at least 19.5% oxygen if using filter type RPE.
- Use only single use RPE once.

Appendix A: Information Needed to Select RPE

Before the proper respirator can be selected for a job, you have to:

- » Identify the respiratory hazard.
- » Evaluate the hazard.
- » Consider whether engineering controls are feasible.

The following questions will need to be answered before an occupational hygienist or supplier can select the right respirator for the job:

1. Is it to be used in firefighting or emergencies?
2. Is it to be used in oxygen-deficient atmospheres (less than 19.5% Oxygen in air)?
3. What is the nature of the hazard (chemical properties, concentration in the air, warning properties)?
4. Is the airborne contaminant a gas, vapor or particulate (mist, dust or fume)?
5. Are the airborne levels below or above the exposure limit, or are they above levels that could be immediately dangerous to life or health?
6. What are the health effects of the airborne contaminant (carcinogenic, potentially lethal, irritating to eyes, absorbed through the skin)?
7. What are the characteristics of the operation or the process (e.g., hot temperature, confined space)?
8. What activities will the worker be doing while wearing the respirator (e.g., strenuous work)?
9. How long will the worker need to wear the respirator?
10. Does the selected respirator fit the worker properly?
11. Where is the nearest safe area that has respirable air?