

Respirators: The Why, When, What

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Before You Begin

- Identify tasks that pose an inhalation hazard based on potential concentration, duration of work task, and occupational exposure limits.
- Conduct air monitoring to obtain results quantifying the potential inhalation hazards.
- Review Occupational Safety and Health Administration's (OSHA) respiratory protection standard, 29 CFR 1910.134 and develop a written program that is specific to your workplace.

What Will You Learn

- Determining when respirator is appropriate
- The selection criteria for making the right respirator and cartridge choices

Introduction

Inhalation is the primary way occupational contaminants enter our bodies. Employees can use personal protective equipment in the form of respirators while you implement other preventive measures or if preventive measures are not feasible. Employers must choose the correct respirator and cartridges to protect against specific contaminants.

Discussion

Our respiratory system has natural barriers that help protect us from airborne contaminants. The action of hairs in our nose and in the muco-ciliary lining of the throat filters large particulates. However, smaller particulates can bypass this system and get into the deepest parts of our respiratory system (the bronchioles and alveoli). Many gases, vapors and biological hazards can also reach deep into our lungs. Contaminants that we inhale can directly affect the lungs and may also be absorbed into the bloodstream, potentially damaging other target organs. Examples include carbon monoxide affecting the blood, benzene leading to leukemia and lead disrupting the central nervous system. An additional hazard may be present when the atmosphere does not contain sufficient oxygen.

A respirator is the last line of defense in protecting an employee from an inhalation hazard. Before implementing respiratory protection, you should reduce the exposure as low as possible through engineering and administrative controls such as local exhaust ventilation, product substitution or exposure time. Administering a respiratory protection program can be expensive and time consuming. Some employees find respirators uncomfortable to wear. In addition, respirator use of all types, positive as well as negative pressure, can cause alterations in breathing patterns, hypoventilation, retention of carbon dioxide and an increase in workload on the body.

A respirator is required:

- Whenever employees are exposed to airborne contaminant concentrations that exceed or have a significant potential to exceed occupational exposure limits;
- When the employer requires an employee to wear a respirator;
- When the atmosphere does not contain sufficient oxygen.

When selecting the National Institute of Occupational Safety and Health (NIOSH) approved respirators, you must base your choice on an evaluation of the respiratory hazard. This includes potential exposure information and the chemical state and physical form of the contaminant. Employers choose respirator styles based on the level of protection they provide to protect employees from a measured concentration of the air contaminant. Select respirator filters, cartridges and canisters based on the hazard they protect against. Labels and color coding indicate hazard protection.

There are several types of respirators such as positive or negative pressure and tight and loose fitting. Positive pressure means the pressure inside the respiratory inlet covering of the respirator exceeds the ambient air pressure outside the respirator. A positive pressure respirator prevents contaminants from leaking into the respirator around the face seal. Negative pressure means the air pressure inside the facepiece is negative relative to the air pressure outside the respirator during inhalation. An example of a tight fitting, negative pressure respirator is a half-mask respirator.

An example of a loose fitting, positive pressure respirator is a powered air-purifying respirator. An example of a tight fitting, positive pressure respirator is a self-contained breathing apparatus. You must fit test employees in the same make, model, size and style of respirator that they will use. A good respirator fit requires that nothing interfere with the seal of the respirator to the face. This includes facial hair and safety glasses.

Conclusion

Respiratory protection can protect employees from inhalation hazards. However, respirators are effective only if you select the proper respirator to protect against the inhalation hazard, the employee wears the respirator correctly and maintains a good seal. Using resources such as NIOSH's *Respirator Decision Guide* and OSHA's Respiratory Protection Standard can help make your company's respiratory program a success.

References

The National Institute for Occupational Safety and Health Respirator Selection Logic.
<http://www.cdc.gov/niosh/docs/87-108/pdfs/87-108.pdf>

OSHA's Respiratory Protection Standard, 29CFR1910.134.

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