RESPIRATORY PROTECTION

Introduction

One of the principal routes by which chemicals can enter the body is through inhalation. If an individual is exposed to an excessive airborne concentration of a chemical over a long period of time, undesirable health effects can result.

The Occupational Safety and Health Administration (OSHA) has set maximum exposure standards for many airborne toxic materials. The Office of Environmental Health and Safety (EHS) can assist in determining whether a worker's exposure to chemicals and/or particulates with which he or she works exceeds these standards. If the permissible exposure limit is exceeded, the exposure must be reduced to acceptable levels through the use of engineering and/or administrative controls.

Engineering controls include the following:

- substitution with a less toxic material
- change in process to minimize contact with hazardous chemicals
- isolation or enclosure of a process or work operation
- wet methods to reduce the generation of dust, when applicable
- general dilution ventilation
- local exhaust, including the use of chemical fume hoods or other types of specialized ventilation systems

Administrative controls include employee-training, use of standard operating procedures, and work scheduling to minimize the length of exposure. Respirators and other personal protective equipment may be used where engineering controls are not feasible or cannot reduce exposure to acceptable levels, or while engineering controls are being installed. The need for a respirator is dependent upon the type of operations and the nature and quantity of the materials in use and must be assessed on a case by case basis.

Scope and Application

The use of respirators at the University of Arkansas is subject to prior review and approval by EH&S. The OSHA Respiratory Protection Standard regulates any use of respiratory protection.

Any individual who has received approval by EH&S to use a respirator, including self-contained breathing apparatus (SCBA) and powered air purifying respirators (PAPR), must be enrolled in the Respiratory Protection Program. A physical examination and health history review will be conducted by the University Health Center for medical approval and surveillance.

Respiratory protection, through the use of supplied air or self-contained breathing apparatus, is required for work in oxygen deficient atmospheres. It also may be necessary during non-routine operations in which the individual is exposed briefly to high concentration of a hazardous substance (e.g., maintenance or repair activities or during spill clean-up).

Program Description

The use of respirators is regulated by OSHA through the *Respiratory Protection Standard* (29 CFR 1910.134). The standard requires the development of a Respiratory Protection Program, including all of the elements described below.

Initial Hazard Assessment

Anyone who believes that respiratory protection is needed during the course of his or her work must notify EH&S. EH&S will evaluate the potential hazards of the work and determine whether respiratory protection is needed. This may involve personal and area air sampling to measure exposure levels.

Respirator Selection

EH&S determines the type of respirator needed (e.g., half-face or full-face air purifying respirator, powered air purifying respirator, supplied air respirator or self-contained breathing apparatus) based on the results of the initial hazard assessment. When air-purifying respirators are recommended, the appropriate type of filter or chemical cartridge is selected. Only respirators and supplies approved by the National Institute of Occupational Safety and Health (NIOSH) may be used.

Medical Surveillance

Prior to the assignment of respiratory protection, the individual must be evaluated by the University Health Center to determine whether he or she is able to wear a respirator. This involves the completion of a medical history questionnaire, a limited physical examination and baseline laboratory testing. This may include a pulmonary function test, a chest x-ray, an echocardiogram, a urinalysis and a complete blood count.

The medical history questionnaire (which is part of the annual Respirator Fitting Form) must be completed annually by each individual enrolled in the Respiratory Protection Program and is reviewed by a licensed healthcare professional. The frequency of

physical examinations and laboratory testing is at the discretion of the physician, based, in part, on age and general health.

Training and Fit-Testing

Individuals who require respiratory protection must receive training before using a respirator. Training, which can be supplied by EH&S, must include discussion of the need for respiratory protection, the elements of the Respiratory Protection Program and the individual's responsibility under it, the medical surveillance program, proper use of respiratory protection, respirator maintenance, and handling emergency situations.

Individuals required to wear negative pressure respirators must be fitted properly and tested for an adequate seal prior to use in a contaminated atmosphere. Qualitative fit-testing using banana oil is performed by EH&S. Instructions on performing positive and negative pressure checks are provided to respirator users so that they may check their respirator's fit in the field.

SCBA users must show proficiency donning and doffing the respirator. It is imperative that they know how the SCBA functions and how to use it under varying conditions.

All respirator users must attend training and be fit-tested annually.

Inspection and Maintenance

Respirator users are responsible for regular cleaning and inspection of their respirators, including looking for defects and missing parts. Respirators must be stored properly in order to protect them from dust, sunlight, excessive heat or cold, moisture and chemicals. Inspection forms are available through EHS and are distributed during annual training.

SCBA must be inspected at least monthly and a record of the inspection must be maintained. The department appoints an individual or group to be responsible for the monthly inspections. Inspection forms are available through EHS and are distributed during annual training.

Recordkeeping

For each individual assigned a respirator, the department maintains records of training, fit-testing, and respirator inspections. Medical

records, including copies of the Respirator Fitting Form and results of physical examinations, are kept by the University Health Center.

Roles and Responsibilities

Department

- Recognize potential hazards and contact EH&S for evaluation.
- Purchase respirators and associated equipment.
- Notify EH&S of new individuals requiring respiratory protection.
- Spot check respirators periodically.
- Maintain inspection records of SCBA units.
- Notify EHS of changes in procedures.

Supervisors

Recognize potential hazards and notify the department or EHS.
Enforce the use of respiratory protection, where necessary.

EHS

Identify and evaluate hazards.
Select suitable respiratory protection options.
Conduct initial and annual training and fit-testing.
Conduct initial and periodic practice sessions for SCBA and PAPR users.
Perform periodic reevaluations of exposures.
Maintain records of fit-testing when required and training.
Audit departmental program periodically.

Individual

Recognize and report potential hazards to Supervisor.
Use respiratory protection as instructed.
Attend training and fit-testing annually
Inspect respirator for defects or missing parts.
Clean and store respirator as instructed.

For More Information

Contact EH&S at 575-5448