



# Eye on Safety

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National Institutes of Health  
Office of Research Services  
Division of Occupational  
Health and Safety

Providing a safe and healthy  
environment for employees,  
patients and visitors.

*“Safe science and good  
science go hand-in-hand.”*

The articles in this Newsletter are intended to provide general summary information to the National Institutes of Health (NIH) community. They are not intended to take the place of either the written law or regulations. It is not NIH's intention to provide specific advice to readers of this Newsletter, but rather general information to help better understand how to prevent or reduce workplace injuries and illnesses.

Reference in this Newsletter to any specific commercial products, process, service, manufacturer, or company does not constitute its endorsement or recommendation by the U.S. Government or NIH.



## Selecting respirators

One of the most difficult aspects of respiratory protection is respirator selection. A great deal of planning is required by employers to ensure the proper respirator is selected for your job. There are numerous requirements employers must understand to prevent overexposures and illness. Selecting the right respirator for the job is essential to protecting your health.

### Identify the contaminants

The first step your employer must do to protect you is to identify the air contaminants. Your employer must determine whether the airborne contaminant is a:

- Particulate (dust, fume, vapor, or mist);
- Chemical; or
- Biological agent (mold, spore, fungus, virus, or bacteria).

To identify the contaminants, your employer will closely observe work practices to complete the picture of how employees are exposed. Employers will look at how your operations generate these contaminants. Employers will pin down the sources of exposure, the length of time employees are exposed, the amount of physical exertion and movement required during the job, and other factors that will influence respirator selection.



As noted in both the Occupational Safety and Health Administration's (OSHA's) contaminants and respiratory protection standards, the use of respiratory protection is only appropriate after the employer has determined and implemented feasible administrative or engineering controls. Respirators should be the last defense from harmful exposures to air contaminants.

### Review exposure limits

Once employers identify the contaminants, the employer can then review information on exposure limits. Meeting OSHA's permissible exposure limits (PELs) outlined in the air contaminants standard (29 CFR 1910.1000) is mandatory; however, there are other sources of exposure recommendations to consider, such as those developed by the National Institute for Occupational Safety and Health (NIOSH) and published in the

NIOSH Pocket Guide To Chemical Hazards.

The American Conference of Governmental Industrial Hygienists (ACGIH®) publishes Threshold Limit Values (TLVs®) for Chemical Substances and Physical Agents and

Biological Exposure Indices (BEIs®). ACGIH® formulates a conclusion on what level of exposure the typical worker can experience without adverse health effects. TLVs® and BEIs®

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## Selecting respirators *(continued from page 1)*

are guidelines to be used by professionals trained in the practice of industrial hygiene.

Employer's must meet OSHA's PELs. However, other exposure recommendations may be more stringent. Employers may decide to meet these stricter exposure recommendations as a good practice.

If OSHA hasn't set a PEL for a contaminant, employers still have to meet the OSH Act's Section 5(a)(1) (the "General Duty Clause") requirements to provide a safe workplace. These other exposure recommendations, along with the OSHA PELs, can help guide employers to meet their General Duty Clause obligations.

### Exposures

Employers should not rely on a novice to measure employee exposures. OSHA's air contaminants standard states at 1910.1000(e) that "a competent industrial hygienist or other technically qualified person" needs to approve administrative or engineering controls or protective equipment used to meet exposure limit requirements.

Employers should work with the person conducting the exposure monitoring to ensure the most reliable results and best recommendations are achieved. Exposure monitoring should be done to capture information on employees' greatest exposures. Employee protection is most assured when control measures are implemented to address the highest anticipated levels of exposure.



### APFs and MUCs

Employers must use the assigned protection factors (APFs) and maximum use concentrations (MUCs) to select respirators that meet or exceed the required level of employee protection.

OSHA states at 1910.134(b), "Assigned protection factor means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program."

Employers use APFs to select the appropriate type of respirator based upon the exposure limit of a contaminant and the level of the contaminant in the workplace. Respirators are selected by comparing the exposure level found in the workplace to the maximum concentration of the contaminant in which a particular type of respirator can be used (MUC). In general, employers can determine the MUC by multiplying the respirator's APF by the

contaminant's exposure limit. If the workplace level of the contaminant is expected to exceed the respirator's MUC, employers must choose a respirator with a higher APF.

### Note NIOSH approvals

OSHA requires employers to select NIOSH-certified respirators (see 1910.134(d)(1)(ii)). NIOSH evaluates and approves respirators per the requirements of 42 CFR part 84. The manufacturer of a NIOSH-certified respirator provides a copy of the NIOSH approval with the respirator. The NIOSH approval indicates those contaminants and airborne concentrations for which use of the respirator is approved. Employers are to only use approved respirators for the contaminants and exposures in workplaces.

If the calculated MUC exceeds the NIOSH-approval performance limits of a respirator's cartridge or canister, the MUC must be recognized as the lower limit based on the approved performance limits.

### Proper use

While a large amount of responsibility falls on the employer, it is your responsibility to use the respirator correctly.

If you aren't using it properly, you're breathing unsafe air. Overexposures can lead to illness and even death.

Improper use can include:

- Using the wrong type of filter or cartridge with an air purifying respirator;
- Wearing a tight-fitting facepiece too loosely so that contaminated air can leak in; or
- Removing the respirator for any reason before leaving the contaminated area.

### Maintenance/storage

Don't wear a dirty or damaged respirator. Using the wrong procedures to clean a respirator can damage it.

Never use paint thinner or other harsh solvents to clean a respirator.

Know how to report damage and get repairs. Only the manufacturer's replacement parts can be used to repair a respirator.

Store respirators so they will stay clean and will not be damaged.

Even though you've passed a medical evaluation before you wear a respirator, remember that people can change. Medical changes can affect your ability to safely wear a respirator. Examples of these can include the development of shortness of breath, dizziness, coughing, wheezing, chest pain, chest injuries, lung diseases, cardiovascular conditions, or heart conditions. Report these signs and symptoms right away.

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# Safety focus: Watch out for slips, trips, and falls

Everyone knows that an elevated surface, such as a ladder or roof, has dangerous fall hazards. However, a slip, trip, and fall on any walking-working surface, even a floor, can cause a serious injury or death.

It is important to be aware of fall hazards even if you have a firm, level working surface to walk on such as office floors or factory shop floors, you can still fall victim to injury.

They can be caused by:

- Water, grease, and other contaminants on the floor;
- Poor drainage from clogged and misaligned pipes;
- Damaged, warped, buckled, or uneven indoor flooring surfaces;
- Outdoor walking surface irregularities;
- Ice and snow at entrances, parking areas, walkways, and outdoor stairways;
- Inadequate lighting; and
- Poorly designed and/or maintained stairs and handrails.

## Housekeeping

Good housekeeping helps prevent many slip, trip, and fall hazards. Any cluttered or wet walking surfaces can easily contribute to an injury.

Do your part to recognize, report, and clean up conditions that could cause an injury by helping to keep:

- The workplace in a clean, orderly, and sanitary condition.
- Aisles and passageways clear of obstructions that could create a hazard such as: protruding nails; splinters; holes; or loose boards, tiles, or carpeting.
- Floors dry by wiping up rain or snow tracked in at entryways. Proper drainage helps keep the floors dry if wet processes are used. Stand on available mats, raised flooring, or dry platforms to stay off slippery, wet floors.

## Ladder safety

Falls from portable ladders (step, straight, combination, and extension) are one of the leading causes of occupational fatalities and injuries. To use ladders safely:

- Never use a metal ladder near electrical lines.
- Always inspect the ladder for damage before you use it.
- Use ladders only for their designed purposes.
- Set up the ladder on a firm, solid surface.
- Secure ladders to prevent displacement, or set up a barricade to keep traffic away from the ladder.



- Don't place a ladder on boxes, barrels, or other unstable bases to obtain additional height.
- Be sure to lock the spreaders to keep a step ladder open.
- Be sure that all locks on an extension ladder are properly engaged.
- Set up an extension or straight ladder so that it extends at least three feet above the top point of support.
- Set up a straight ladder by placing its base one quarter of the working length of the ladder away from the wall.
- Don't exceed the maximum load rating of a ladder. This includes the weight of any tools or equipment you use while you're on the ladder.
- Clear away any slippery material on the rungs, steps, or feet of the ladder.
- Always face the ladder while climbing.
- Always maintain a three point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Use a rope to raise and lower tools and materials you need when you reach the top.
- Keep your body near the middle of the step, between the rails.
- Don't stand on the three top rungs of a straight, single, or extension ladder.
- Don't use the top step or rung of a ladder as a step or rung unless it was designed for that purpose.

## Stairs

Every flight of stairs with four or more risers must have standard stair railings or standard handrails. A stair railing must be built similar to a standard railing, but it must have a vertical height between 30 and 34 inches to the surface of the tread.

Avoid painful injuries from falling down stairs by paying close attention and:

- Keeping stairs free of any slippery, wet, or icy conditions;
- Removing any clutter from the stairway and landings;
- Using all available lighting in the area;
- Holding the handrail;
- Getting help to carry large or awkward loads on stairs; and
- Never skipping a step.

Slips, trips, and falls continue to be the cause of many workplace injuries and fatalities — be proactive. Take the time to pay attention and see hazards. Prevent, slips, trips, and falls for not only yourself, but also your co-workers.

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The purpose of this newsletter is to provide a forum for the dissemination of health and safety information. It is intended to enhance communication to National Institutes of Health (NIH) employees, raise awareness of current safety policies and procedures, and provide guidance on relevant issues. It is provided as a service by the NIH, Office of Research Services, Division of Occupational Health and Safety.

For more health, safety and services information, visit the NIH, Office of Research Services, Division of Occupational Health and Safety's website at: <http://www.ors.od.nih.gov/sr/dohs> or call us at: (301) 496-2960.

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## Make healthy food taste good

*"Be sure to put your feet in the right place, then stand firm."*

Abraham Lincoln





*Flavorful items can make healthy foods something you crave.*

If you think the words "healthy foods" are synonymous with "bland diet," you're in for a pleasant surprise.

With a few flavorful items and a focus on variety, it's easy to turn healthy foods into something you crave at every meal:



 **Go nuts (within reason).** Sprinkle some sliced almonds on a salad or sliced fruit. Try toasted walnuts on oatmeal, rice, or couscous. Mix pine nuts with steamed spinach, a little olive oil, garlic, and pepper. Nuts are calorie-dense, so a serving size is about one ounce.

 **Make a vinaigrette.** It's easy to make your own salad dressing that doesn't have the high sugar content of many store brands. Combine 3 tablespoons olive oil, 2 tablespoons vinegar, and a little salt and pepper. Sweeten with a small amount of honey or real maple syrup.



**Prepare it a new way.** Try peppers, squash, and zucchini on the grill. Roast broccoli in the oven with a little olive oil. Steam vegetables with parsley, thyme, dill, rosemary, or garlic.



**Choose flavorful cheese.** Add a little sharp cheddar, Parmesan, or feta cheese to a salad or pasta dish.



**Try something new.** When choosing fruit, move beyond apples, bananas, and oranges. Pick up a mango, pineapple, or kiwifruit.



**Replace meat with beans.** Add black beans to the ground meat in an enchilada, or add white or pinto beans to a soup recipe.



**Check the freezer.** Use frozen vegetables rather than canned. Frozen veggies provide more nutrients and less added salt.



**Shop in-season.** Check your local farmer's market for fresh fruits and vegetables. See if your grocery store offers locally grown produce.



**Get growing.** If you have the space and inclination, grow your own lettuce, tomatoes, peas, and beans. Plant some strawberries or raspberry bushes. You'll be amazed at the flavor of fresh-picked vegetables, fruits, and berries.