# Electronic Waste Recycling: Working Safely

Workers may encounter hazards in electronic waste (e-waste) recycling, including the risk of injury, hearing loss, and exposure to toxic dusts and other chemicals. These hazards can cause permanent and serious health problems that could begin without workers being aware of them. Employers must provide a safe and healthy workplace. This fact sheet describes actions e-waste recycling companies can take to control these hazards and ways workers can protect themselves.

### Do you work with recycled electronics?

- Electronics recycling can pose risks to workers. These include:
  - Illness from toxic metal dusts
  - Injuries from lifting and moving heavy objects
  - Cuts or eye injuries from sharp objects
  - Hearing loss from noise exposure





**D**id you know?

- A good safety program can help workers avoid these hazards, such as having:
  - Controls that reduce exposure to hazardous dust
  - Tools and lifting devices that minimize stress on the body
  - Protective clothing and safety glasses to avoid cuts and eye injuries
  - Hearing protection to prevent hearing loss



> Used electronic equipment must be kept out of the weather and secure.

### Employers are responsible for providing a safe workplace. They must:

- Identify and control hazards in the workplace.
- Regularly inspect the workplace and correct unsafe conditions.
- Have a written Injury and Illness Prevention Program that describes how the employer will protect workers from hazards.
- Provide and require use of safe tools and equipment.
- Train workers about job hazards and safe work practices.

# Workers also have responsibilities for safety. They should:

- Wear personal protective equipment (PPE) such as eye and ear protection, gloves, and where indicated, respirators, when a potential hazard is present.
- Work with their supervisor or employer to find ways to reduce their exposures.
- Report unsafe conditions to their supervisor or safety committee.

 Share smart work practices with new employees.



Chemical Hazards Found in E-Waste:		
E-waste component	Potential hazard	Potential health effects from long-term exposure
Cathode ray tube (CRT) glass, batteries, solder, older printed circuit boards	Lead dust	Anemia, kidney damage, high blood pressure, nerve and brain damage, miscarriage, birth defects
Batteries, switches, thermostats, fluorescent tubes	Mercury vapor	Nerve and brain damage, birth defects
Nickel-cadmium batteries, printed circuit boards, phosphor coating on CRT glass	Cadmium dust	Kidney disease, bone problems, lung cancer
Older printed circuit boards	Beryllium dust	Lung disease, probably lung cancer
Plastic cases and parts	Flame retardant dust	Possible thyroid hormone problems

# Dust can cause health problems

E-waste disassembly, shredding, compacting, and glass breakage create fine dust. This dust may contain metals such as lead, cadmium, or beryllium, as well as flame-retardant chemicals. This dust can affect workers' health. They can breathe it in or swallow it if dust gets on their hands or food. Depending on what is in the dust, even small amounts can be bad for them.

### Easy changes for employers:

- Provide a clean eating area.
- Provide warm water, soap, and clean towels.
- Provide uniforms, smocks, or coveralls and work shoes for workers.
- Provide tools for manually disassembling CRTs and flat screens to enable removal of components before shredding. This will minimize release of toxic materials.

## Cuts and lacerations

Many electronic components have sharp edges or fragments that can cause cuts or lacerations, including eye injuries. Appropriate steps should be taken to minimize and avoid breakage. Broken equipment could cause a release of a hazardous substance to the environment and must be properly cleaned up.

### Easy changes for employers:

Provide protective equipment such as cut-resistant gloves and eye protection to prevent injuries.

### Workers, to protect yourself:

### > Wear safety glasses for disassembly,

**shredding, compacting, and glass handling.** If you (or a neighbor) are using a hammer, mallet or grinder for disassembly, use a face shield and/or screen for extra protection.

Use cut-resistant gloves and arm guards (e.g., Kevlar) for disassembly, sorting of shredded material, and glass handling.

### Workers, to protect yourself:

- Keep your work area clean.
- Do not use brooms to sweep. Wet mop or use a HEPA-filtered vacuum to keep dust levels down.
- Don't eat or smoke while handling e-waste. Wash your hands well with soap and water before eating, drinking, smoking, or using the restroom. Keep drinking water in a closed bottle.
- If CRT glass breaks, mist the broken glass with water to keep dust down and wet mop or HEPA-vacuum the area.



Wet mop or HEPA vac and wear a respirator

### Workers:

### Respirators can further reduce dust exposure.

- Use a respirator when cleaning up broken CRT glass and for other dusty tasks. A half-mask respirator with filters can reduce the amount of dust you breathe in.
- Do a seal check every time you put on the respirator (you will learn how to do this in training).
- Remove your respirator only after leaving the respirator use area.
- Clean your respirator after use and store it properly.

# Noise

Workplace noise can rob workers of their hearing. Hearing loss due to loud noise is preventable and may not be noticeable at first. Hearing can be permanently damaged over time by loud noises from hammering, drilling, shredding, or using power tools.

### Easy changes for employers:

Reduce noise by minimizing vibration of the work table. Possible solutions include placing a layer of plywood or rubber matting on the table.

### **Next steps:**

- Measure full-shift exposures for all workers in order to know who to include in a hearing conservation program.
- Establish a hearing conservation program for all workers with average exposure at or above the action level of 85 decibels.

### **Upgrading your program:**

- Reduce noise using engineering controls when levels are above the exposure limit.
- If engineering controls are not enough, reduce exposures by providing ear muffs or ear plugs or by rotating workers out of noisy areas.

# **M**uscle Injuries

### Electronic waste can be heavy and difficult to handle, causing muscle strains. Repetitive or forceful motions can lead to injury.

### **Easy changes for employers:**

- Provide material handling aids such as dollies, hand trucks, lifters, and turntables.
- Provide grip-enhancing gloves to minimize the amount of force needed by workers to grip tools and materials.

### **Next steps:**

- Provide adjustable work tables and adjust the height for each worker so shoulders remain relaxed.
- Provide tool suspension equipment to prevent lifting or repetitive strain injuries.

### Workers, to protect yourself:

- Your employer may do noise monitoring. Ask to see the results, and make sure you understand what they mean for you.
- If your employer offers to test your hearing, get the test. Ask for a hearing test if your employer does not offer it.
- Always wear hearing protection (ear plugs or muffs) in noisy areas. Hearing protection is required by law in very loud work areas.

#### Workers, to protect yourself:

- Arrange your work station to minimize lifting, twisting, reaching, and carrying.
  - Get help when lifting heavy or large objects. Bend at the knees and don't twist your body when lifting.