

Disposal procedures

Most computer components contain some level of hazardous substances. Printed circuit boards consist of plastics, precious metals, fiberglass, arsenic, silicon, gallium, and lead. CRTs contain glass, metal, plastics, lead, barium, and rare earth metals. Batteries from portable systems can contain lead, cadmium, lithium, alkaline manganese, and mercury.

Until recently there were no widespread regulations when it comes to placing them in the landfill. However, in Europe, this has changed with the introduction of the *Waste Electrical and Electronic Equipment (WEEE)* directive.

Laser-printer toner cartridges can be refilled and recycled. Ink cartridges from inkjet printers also can be refilled and reused. Like laser cartridges, they can be very messy to refill and often do not function as well as new cartridges do. In many cases, the manufacturer of the product will have a policy of accepting spent cartridges.

For both batteries and cartridges, the desired method of disposal is recycling. It should not be too difficult to find a drop site that recycles these products.

In the USA, "Subtitle D" dump sites are non-hazardous solid-waste dump sites. These sites are designed to hold hazardous materials safely.

Several charitable organisations around the country take in old computer systems and refurbish them for various applications.

Many of the cleaning substances used on computer equipment can be classified as hazardous materials. When it comes to disposing of chemical solvents (used to clean computers), it will normally be necessary to clear these items with the local waste-management agencies before disposing of them.

All hazardous materials are required to have Material Safety Data Sheets (MSDS) that accompany them when they change hands. They also are required to be on hand in areas where hazardous materials are stored and commonly used. The MSDS contains information about the following:

- What the material is
- Its physical properties
- Reactivity data
- Any special-protection information
- Its hazardous ingredients
- Fire and explosion data
- Health-hazard information
- Any special-precaution information

The supplier of the hazardous material must provide this information sheet. If you supply this material to a third party, you also must supply the MSDS for the material. The real reason for the sheets is to inform workers and management about hazards associated with the product and how to handle the product safely. It also provides instructions about what to do if an accident occurs involving the material. For this reason, employees should know where the MSDSs are stored in their work area.

Hazards & Safety Procedures

High-Voltage Hazards

You should never enter the interior of a CRT cabinet unless you have been trained specifically to work with this type of equipment. The tube itself is dangerous if accidentally cracked. In addition, extremely high voltage levels (in excess of 25,000 V) can be present inside the housing, even up to a year after electrical power has been removed.

Never open the PSU either. Some portions of the circuitry inside the power supply carry extremely high voltage levels and have very high current capabilities.

Generally, no shock hazards are present inside the system unit. However, you should avoid reaching inside while power is applied to the unit. Jewellery and other metallic objects do pose an electrical threat, even with the relatively low voltage present in the system unit.

The earth connection of a power cord should never be defeated or removed. This plug connects the PC chassis to an earth ground, protecting personnel from electrical shock.

Periodically examine the power cords of the computer and peripherals for cracked or damaged insulation. Replace worn or damaged power cords promptly. Never allow anything to rest on a power cord. Run power cords and connecting cables safely out of the way so that they do not become trip or catch hazards.

Cleaning

Never have liquids around electrical equipment. Before cleaning around the computer with liquids, make certain to unplug all power connections to the system, and its peripherals.

Check equipment vents to see that they are clear and have ample airspace to allow heat to escape from the cabinet. Never block these vents, and never insert or drop objects into them.

Avoiding Laser and Burn Hazards

Laser printers contain many hazardous areas: the laser light can be damaging to the human eye; the fuser unit becomes extremely hot; and some areas contain high voltage circuits.

Another potential burn hazard is the print-head mechanism of a dot matrix printer. During normal operation, it can become hot enough to burn if touched.

It is good practice to have a well-stocked first-aid kit in the work area. In addition, a fire extinguisher should be on hand. Carbon dioxide extinguishers are the type specified for use around electrical equipment. (In the US these are known as "Class C" extinguishers.) Water-based (or foam) fire extinguishers should never be used on electrical equipment.

The following information is subject to national variations and therefore is not required knowledge for the A+ exams.

Fire extinguishers



Water

Powder

Foam

Carbon Dioxide (CO₂)

USE

Paper, wood, textiles & solid materials fires

Liquid, electrical wood, paper & textile fires

Liquid, paper, wood & textile fires

Liquid & Electrical fires

DON'T USE

Liquid, electrical or metal fires

Metal fires

Electrical or metal fires

Metal fires

Extinguishers need to be used properly to put out a fire, which means that they are best in trained hands. The first priority in a fire is to evacuate the building and fire-fighting should be left to the experts if there is any possibility that it may put lives at risk.

In the USA fire extinguishers are generally red and are classified according to

<i>Fire Class</i>	<i>Pictogram</i>	<i>Intended Use</i>
A	Garbage can and wood pile burning	Ordinary combustibles
B	Gasoline can with a burning puddle	Flammable liquids
C	Electric plug with a burning outlet	Energized electrical equipment
D	N/A	Combustible metals
K	Pan burning	Cooking oils

Disposal procedures

Businesses

When businesses produce waste, they have a range of responsibilities. These include complying with the requirements of the Duty of Care, and if they're producing hazardous waste, they need to register as a producer under the new Hazardous Waste Regulations.

The *Waste Electrical and Electronic Equipment (WEEE)* directive introduces new responsibilities for businesses when they dispose of their WEEE. Businesses need to ensure all separately-collected WEEE is treated, recycled and recovered. Whether the business or the producer of the electrical and electronic equipment (EEE) pays for this depends on the circumstances.

If businesses have obligations for the treatment, recycling and recovery of WEEE they will need to report evidence of this to the Government. We expect further guidance from the Government soon on these reporting arrangements.

Producers

For products put on the market after 13 August 2005, producers are responsible for financing the collection, treatment, recovery and disposal of WEEE from business users.

For products put on the market before 13 August 2005 different rules apply. If historic WEEE from businesses is being replaced by new equivalent products, the producer is responsible for financing the collection, treatment, recovery and disposal when supplying the new products. In other cases, for example where the historic WEEE is not being replaced, the end user (the business) has to pay.

This is likely to form part of the normal negotiating processes for supply contracts in the future.