

## ENVIRONMENTAL SAFETY

### Procedures to Protect the Environment



The proper disposal or recycling of hazardous computer components is a global issue. Most computers and peripherals use and contain at least some materials that can be considered toxic to the environment. This section describes tools and procedures that help identify these materials and the steps for the proper handling and disposal of the materials.

Computers and peripherals contain materials that can be harmful to the environment. Hazardous materials are sometimes called toxic waste. These materials can contain high concentrations of heavy metals such as cadmium, lead, or mercury. There are regulations for the disposal of hazardous materials. Contact the local recycling or waste removal authorities for information about disposal procedures and services.



## Classification of wastes according to their origin and type

**Municipal Solid wastes:** Solid wastes that include household garbage, rubbish, construction & demolition debris, sanitation residues, packaging materials, trade refuges etc. are managed by any municipality.

**Bio-medical wastes:** Solid or liquid wastes including containers, intermediate or end products generated during diagnosis, treatment & research activities of medical sciences.

**Industrial wastes:** Liquid and solid wastes that are generated by manufacturing & processing units of various industries like chemical, petroleum, coal, metal gas, sanitary & paper etc.

**Agricultural wastes:** Wastes generated from farming activities. These substances are mostly biodegradable.



**Fishery wastes:** Wastes generated due to fishery activities. These are extensively found in coastal & estuarine areas.

**Radioactive wastes:** Waste containing radioactive materials. Usually these are byproducts of nuclear processes. Sometimes industries that are not directly

involved in nuclear activities, may also produce some radioactive wastes, e.g. radio-isotopes, chemical sludge etc.

**E-wastes:** Electronic wastes generated from any modern establishments. They may be described as discarded electrical or electronic devices. Some electronic scrap components, such as CRTs, may contain contaminants such as Pb, Cd, Be or brominated flame retardants.

**Non-hazardous**/solid waste is all waste which has not been classified as hazardous: paper, plastics, glass, metal and beverage cans, organic waste etc. While not hazardous, solid waste can have serious environmental and health impact if left uncollected and untreated.

**Hazardous** waste is waste that has been identified as potentially causing harm to the environment and human health and therefore needs special, separate treatment and handling. Chemical and physical characteristics determine the exact collection and recycling process. Flammability, corrosiveness, toxicity, ecotoxicity and explosiveness are the main characteristics of hazardous waste. Liquid, gaseous and powder waste need special treatment by default to avoid the dispersal of the waste.

**Most hazardous waste originates from industrial production. Special kinds of hazardous waste include:**

- **E-waste** is waste from electric and electronic equipment such as end-of-life computers, phones and home appliances. E-waste is generally classified as hazardous because it contains toxic components.
- **Medical** waste originates from the human and animal healthcare systems and usually consists of medicines, chemicals, pharmaceuticals, bandages, used medical equipment, bodily fluids and body parts. Medical waste can be infectious, toxic or radioactive or contain bacteria and harmful microorganisms (including those that are drug-resistant).

- **Radioactive** waste contains radioactive materials. The management of radioactive waste differs significantly from that of other waste. Auditing the management of radioactive waste is not the subject of this MOOC.



Almost 99% of the components of a computer can be recycled. Recycling can avoid serious toxins, chemicals and heavy metals from going to landfills and polluting the environment. Being a significant part of waste electrical and electronic equipment (WEEE), computer waste is gaining more attention due to its tremendous generation and toxic environmental concerns. The complex and diverse material content in the computer makes them ideal for recycling. At the same time, presence of hazardous contents such as flame retardants and heavy metals makes obstructions in recycling procedure. The recycling method will vary for each material and component of e-waste.

The source of waste	Wastes	How to treat
Batteries from portable computer systems.	Contain rare earth metals that can be harmful to the environment (lead, cadmium, lithium, alkaline manganese, and mercury. These metals do not decay and remain in the environment for many years).	<i>GOST R 52105-2003</i> Resources saving. Waste treatment. Classification and treatment methods of the mercury containing waste. Basic principles.
Industrial emissions	Carbon dioxide	<i>SanPiN 2.1.7.2790-10</i> . Sanitary and Epidemiological Requirements for Medical Waste Management
Monitors.	Cleaning fluids or pesticides, or the by-products of manufacturing processes.	
Liquid Industrial Waste	Carbon monoxide, nitrogen oxides	<i>GOST 30775-2001</i> Resources saving. Waste treatment. Waste classification, identification and coding. Basic principles "Federal classification catalog of waste"
Toner Kits, Cartridges, and Developers.	Contain solvents and other cleaning supplies.	On approval of the Criteria for classifying waste to I-V hazard classes according to the degree of negative impact on the environment
Vehicle exhaust emissions	Sulfur dioxide	<i>SP 2.1.7.1386-03</i> . Sanitary rules for determining the hazard class of toxic production and consumption wastes
Chemical Solvents and Aerosol Cans	Greenhouse gas	THE FEDERAL LAW. Production and consumption waste
Used oil, liquids, solids, gases, or sludges and hazardous household liquids	Pesticides and fertilizers	
Fluorescent lamps	Liquids that are hazardous or potentially harmful to human health or the environment.	
Combustion source	Contain glass, metal, plastics, lead, barium, and rare earth metals.	