



Chapter 2: Safe Lab Procedures and Tool Use



IT Essentials: PC Hardware and Software v4.0

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Chapter 2 Objectives

- 2.1 Explain the purpose of safe working conditions and procedures
- 2.2 Identify tools and software used with personal computer components and their purposes
- 2.3 Implement proper tool use



Chapter 2 Worksheets and Labs

- 2.2.2 Worksheet: Security and Diagnostic Software
- 2.3.4 Lab: Computer Disassembly



Safe Lab Procedures and Tool Use

The workplace should have safety guidelines to follow to:

- Protect people from injury
- Protect equipment from damage
- Protect the environment from contamination



Recognize Safe Working Conditions

Some things to look for:

- Clean, organized, and properly lit workspace
- Proper procedures for handling equipment
- Proper disposal or recycling of components containing hazardous materials



General Safety Guidelines

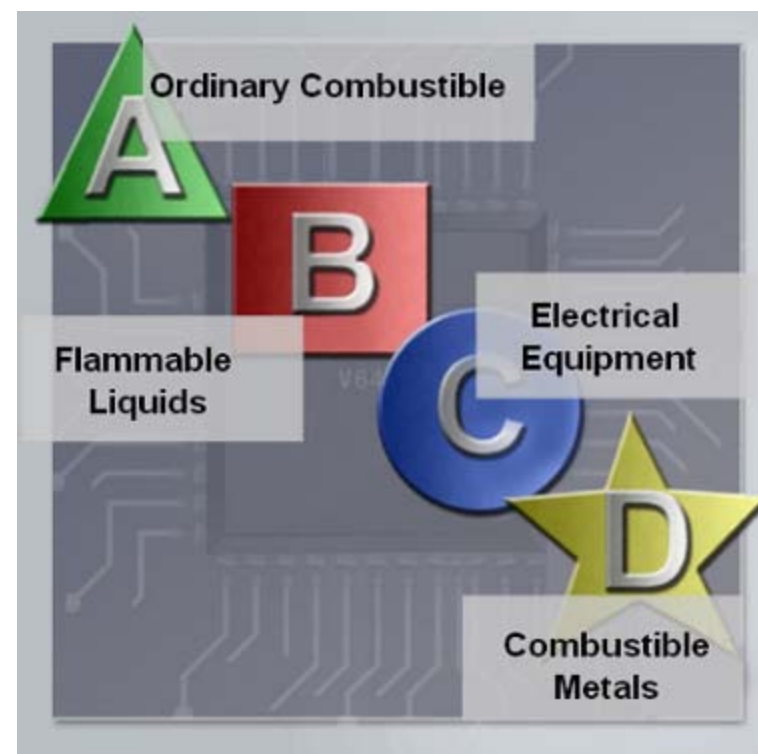
- Most companies require reporting any injuries, including description of safety procedures not followed.
- Damage to equipment may result in claims for damages from the customer.
- **CAUTION:** Power supplies and monitors contain very high voltage. Do not wear the antistatic wrist strap when repairing power supplies or monitors.
- **CAUTION:** Some printer parts may become very hot when in use and other parts may contain very high voltages.



Fire Safety Guidelines

Have a fire plan before you begin work:

- Know the location of fire extinguishers, how to use them, and which to use for electrical fires and for combustible fires
- Have an escape route in case a fire gets out of control
- Know how to contact emergency services quickly
- Keep the workspace clean
- Keep most solvents in a separate area



Electrostatic Discharge (ESD)

- Static electricity is the buildup of an electric charge resting on a surface. This buildup may zap a component and cause damage.
- At least 3,000 volts of static electricity must build up before a person can feel ESD, but less than 30 volts of static electricity can damage a computer component.

Preventing ESD Damage

- Use antistatic bags to store components
- Use grounded mats on workbenches
- Use grounded floor mats in work areas
- Use antistatic wrist straps when working on computers



Power Fluctuation

AC power fluctuations can cause data loss or hardware failure:

- Blackouts, brownouts, noise, spikes, power surges

To help shield against power fluctuation issues, use power protection devices to protect the data and computer equipment:

- Surge suppressors
- UPS
- SPS



CAUTION: Never plug a printer into a UPS device. UPS manufacturers suggest not plugging a printer into a UPS for fear of burning up the printer motor.

Material Safety Data Sheet (MSDS)

- The name of the material
- The physical properties of the material
- Any hazardous ingredients contained in the material
- Reactivity data, such as fire and explosion data
- Special protection requirements
- Procedures for spills or leaks
- Special precautions
- Health hazards



U.S. Department of Labor
Occupational Safety & Health Administration
www.osha.gov MyOSHA Search Advanced Search | A-Z Index

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1206. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Proper Disposal



- Batteries from portable computer systems may contain lead, cadmium, lithium, alkaline manganese, and mercury. Recycling batteries should be a standard practice for a technician.
- Monitors contain up to 4 pounds of lead, as well as rare earth metals. Monitors must be disposed of in compliance with environmental regulations.
- Used printer toner kits and printer cartridges must be disposed of properly or recycled.
- Contact the local sanitation company to learn how and where to dispose of the chemicals and solvents used to clean computers.

Tools for the Job

Skilled use of tools and software makes the job less difficult and ensures that tasks are performed properly and safely.

- ESD Tools
 - antistatic wrist strap, mat
- Hand Tools
 - screwdrivers, needle-nose pliers
- Cleaning Tools
 - soft cloth, compressed air can
- Diagnostic Tools
 - digital multimeter, loopback adapter





Software Tools

Disk management tools

- **Fdisk** - create and delete disk partitions
- **Format** - prepare a hard drive prior to use
- **Scandisk** or **Chkdsk** - check for physical errors on the disk surface
- **Defrag** - optimize use of space on a disk
- **Disk Cleanup** - remove unused files
- **Disk Management** - creates partitions and formats disks (GUI interface)
- **System File Checker (SFC)** – scans the operating system critical files and replaces any files that are corrupt

Organizational Tools



- Personal reference tools
 - Notes, journal, history of repairs
- Internet reference tools
 - Search engines, news groups, manufacturer FAQs, online computer manuals, online forums and chats, technical websites
- Miscellaneous tools
 - Spare parts, a working laptop

Proper Use of Antistatic Wrist Strap

Can prevent ESD damage to computer components.

- Connect the cable to the metal chassis of the computer
- Wrap the strap around your wrist
- The connection will keep your body at the same voltage (potential) as the computer
- Attach the wire on the same side of the equipment as the arm wearing the antistatic wrist strap to keep the wire out of the way while you are working.



CAUTION: Never wear an antistatic wrist strap if you are repairing a monitor or CRT.

Proper Use of Antistatic Mat

- Lay the computer on the mat.
- Connect the computer to the mat with the cable.
- Connect the mat to a reliable electrical ground with its cable.
- Now, you and the computer are at ground potential.



Proper Use of Hand Tools

- Use the proper type and size of screwdriver by matching it to the screw.

Phillips, Flat Head and Hex are the most common types.

- Do not over tighten screws because the threads may become stripped.
- **Caution:** If excessive force is needed to remove or add a component, something may be wrong.
- **Caution:** Magnetized tools should not be used around electronic devices.
- **Caution:** Pencils should not be used inside the computer because the pencil lead can act as a conductor and may damage the computer components.





Proper Use of Cleaning Materials

To clean computers and accessories:

- Use mild cleaning solution and lint-free cloth to clean computer cases, outside of monitor, LCD screen, CRT screen, and mouse.
- Use compressed air to clean heat sinks.
- Use Isopropyl alcohol and lint-free swabs to clean RAM.
- Use hand-held vacuum cleaner with a brush attachment to clean a keyboard.
- **CAUTION:** Before cleaning any device, turn it off and unplug the device from the power source.





Chapter 2 Summary

Safe Lab Procedures and Tool Use

- Follow safety procedures for personal protection, equipment protection, and environmental protection.
- Know what tools and software to use in working with computers and computer components.
- Follow proper use of tools.
 - Anti-static wrist strap, anti-static mat, various hand tools, and cleaning materials



Additional Resources

- U.S. Dept of Labor, Occupational Safety & Health Administration
<http://www.osha.gov>
- Microsoft Technet website <http://www.technet.microsoft.com>
- The PC Guide <http://www.pcguide.com>
- Computer Hope.com: Free computer help for everyone.
<http://www.computerhope.com>
- Tech Support Forum <http://www.techsupportforum.com/>
- PC Technology Guide: What We Learn, We Share
<http://www.pctechguide.com>
- PC TechBytes: Computers Made Easy, Computer Repair Support
<http://www.pctechbytes.com>
- TechWatch: Your Source For Technology, News, Reviews and Pricing
<http://www.techwatch.com.au>
- TechRepublic: A Resource for IT Professionals
<http://www.techrepublic.com>
- The Tech Zone.com <http://www.thetechzone.com>

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