

PPPL	PRINCETON PLASMA PHYSICS LABORATORY ES&H DIRECTIVES	
	ES&HD 5008 SECTION 9, CHAPTER 12 Safe Use of Tools	
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		Page 1 of 4

CHAPTER 12 SAFE USE OF TOOLS

12.1 INTRODUCTION

This chapter defines the requirements for the safe use of tools. Hand, portable, and machine tools are covered in this chapter because many general practices are common to all of them.

Accidents involving the use of this type of equipment are relatively common. Although the severity of the injury usually is not great, it often results in considerable inconvenience and loss of efficiency to the persons involved.

Because of the many different tools used at the Laboratory, most of the following paragraphs are general in nature, with a few specific tools being mentioned.

12.2 SCOPE

This chapter pertains to all employees using tools at PPPL.

12.3 DEFINITIONS (RESERVED)

12.4 RESPONSIBILITIES

12.4.1 Department or Division Heads are responsible for assuring that their employees are trained in and adhere to safe practices as outlined in this chapter, for periodic inspection of all tools, and for proper procedure development wherever necessary.

12.4.2 All employees are responsible for using tools safely in accordance with the guidelines specified in this Chapter.

12.5 REQUIREMENTS (RESERVED)

12.6 PRACTICES/PROCEDURES

12.6.1 Hand tool rules include:

- A. Cutting tools must be kept sharp to do efficient and safe work.
- B. Check the head fastening on hammers before use.
- C. All files shall be provided with proper handles.

- D. Use hand tools for their intended purposes - never hammer with wrenches or pry with screwdrivers or files.
- E. Be sure that tools are not placed where they may cause tripping or may fall on someone. Collect and store all tools at the end of each shift. Place attachments and equipment not in use in cabinets or areas provided for them.
- F. Never use a chisel or other tool with a mushroomed or spalled head.

12.6.2 Machine tool rules include:

- A. Request instructions before using unfamiliar machines. Determine the position of the shut-off switch before beginning.
- B. Guards are placed on machinery for protection. They shall not be removed unless it is necessary for repair, adjustment, oiling, or other maintenance. Machines where guards have been removed shall be Locked Out and Tagged Out in accordance with Procedure ESH-016. Be certain guards have been replaced before the unit is put back in service.
- C. The wearing of rings, key chains, flowing ties, loose or ragged clothing, or long hair without a hairnet around rotating or reciprocating machinery is forbidden.
- D. Do not distract a machine operator while working.
- E. "Horseplay" is strictly forbidden.
- F. Machines, not portable by hand, that require any disassembly in order to perform maintenance (oiling, cleaning or adjusting, etc.) shall be locked and tagged out of service prior to the commencement of maintenance activities.
- G. A machine shall not be left unattended with the power on unless authorized.
- H. Safety and accident prevention tags (ESH-001) shall be used on any machinery or work that might cause injury to others or damage to property. For instance, there should be tags on:
 - 1. Switches that are locked out to allow repairs or oiling of machinery
 - DANGER, LOCKOUT/TAGOUT
 - 2. Hot work.
 - DANGER, LOCKOUT/TAGOUT
 - 3. Machinery that is defective or out of order.
 - WARNING OR CAUTION
- I. Floors adjacent to the point of operation of machinery must be kept dry and clear of refuse to minimize danger of slipping. Absorbent compound may be spread on wet floors as a temporary protection.
- J. Place chips, dirty rags, and other waste in containers provided for that purpose. Use chip brushes to sweep off chips and shavings from machines.

- K. Use splash guards on machines where cutting oils or coolants are used.
- L. Keep bench drawers closed when not in use.
- M. Compressed air shall be used only for the job for which it is intended and never for cleaning clothing or for "horseplay."

12.6.3 Power and operating controls should be located within easy reach of the operator so that it is unnecessary to reach over the machine to make adjustments or to leave the work position to cut off power. This does not apply to constant pressure controls used only for setup purposes.

12.6.4 Provision shall be made to prevent machines from automatically restarting after interruption of power if an automatic restart could cause injury. Prevention devices shall be rated for available short-circuit current.

12.6.5 On each machine operated by electric motors, positive means shall be provided for rendering such controls or devices inoperative while repairs or adjustments are being made to the machines they control.

12.6.6 Each operating treadle shall be protected against unexpected or accidental tripping.

12.6.7 Air powered tools

- A. Air powered tools, because they are mobile and difficult to guard, present special hazards to the operator and to others in the vicinity. Since the tools are handled manually, dropping is always a hazard.
- B. Hose laid across aisles and traveled areas creates a tripping hazard. Air hose should be suspended above aisles and work areas, if possible.
- C. Goggles and face shields must be worn when air powered tools such as grinders, buffers, and sanders are being used. When the use of a tool produces harmful or continuous dust, respirators must be worn. Operators must not wear loose clothing, ties, gloves, or jewelry.

12.6.8 Power tools

- A. Careful training is needed in the use of power tools due to equipment power and operating speed. Machines can "get away" from a person and cause serious harm.
- B. Any components being worked by portable power tools must be **SECURELY** braced or clamped to prevent unexpected and uncontrollable motion (i.e., rotation) of the component. Consideration should be made to clamping rather than holding with hands or feet whenever possible. Additional consideration should be given to wearing cut resistant gloves when working with sharp sheet-metal components (NOT applicable to fixed machinery).
- C. Components being worked on fixed power tools (i.e., drill presses, table saws, lathes) must be properly secured as appropriate for the tool. Specific requirements include:
 - 1. Work pieces must be clamped to the table when drilling with a drill press.
 - 2. Work on a table saw must be guided by a fence or miter gauge, never cut free hand.

- D. Portable electric tools must be grounded or identified as double insulated. All tool purchase requests shall specify three-wire grounding cords or double insulation. Any portable electric tools on hand that do not have built-in ground wires or double insulation shall be replaced with three-wire or battery operated tools. All portable electric tools used with extension cords must also use a Ground Fault Circuit Interrupter (GFCI).

12.7 REFERENCES

Argonne National Laboratory, "Central Shops Safety Rules."

Argonne National Laboratory, "Learn and Live" Manual, ZGS.

National Safety Council, Accident Prevention Manual for Industrial Operations, Chicago, current edition.

29 CFR 1910, Subpart P - "Hand and Portable Powered Tools."