

Laser Cutter Safety Guidelines

Overview

Laser cutters are devices which use high energy laser beams to cut, bore, or etch surfaces at a high degree of accuracy. Due to this ability laser cutters can be found in a variety of settings ranging from maker spaces, art departments, engineering labs, and even homes. To cut materials, the laser beams are high energy and therefore dangerous. The risk is greatly reduced with interlocks where the beam is controlled and enclosed. These engineering controls, along with proper training and awareness, allow these powerful lasers to be used with minimal risk to users.

It is of utmost importance to never attempt to defeat the engineering controls at any time. Cutters typically use CO₂ lasers which operate at 10600 nm and are invisible to the human eye meaning the laser could be on but the operator would not know by appearance. Severe eye and skin injuries could occur with beam exposure. Hazards also include laser generated air contaminants (LGAC), electrical, as well as fire.

Classifications

Laser cutters are typically classified as a Class 1 system according to the ANSI Z136.1 standard due to their low risk due to their engineering controls. However, the lasers themselves are usually in the Class 3B or 4 range which means they can cause immediate injury to eye and skin and possibly be a fire risk. Laser cutters should only be purchased from reputable companies which follow FDA regulations regarding laser safety

Laser Generated Air Contaminants (LGAC)

LGAC's are contaminants that are produced as the laser beam interacts with the media being cut. These include particulates and gasses. All cutters must have proper ventilation and assure manufacturer recommendations are followed. This includes changing filters as required and/or installing an external exhaust system. Cutting unapproved material can be extremely dangerous and lead to hazardous gas emissions and/or fire. Questions on ventilation and exhaust can be directed to UML EHS at 978-934-2618 or EHS@uml.edu



Fire

High power lasers create high temperatures which can result in fire. Only approved material by the manufacturer can be used to avoid fire hazards. Cutting deck needs to be cleaned routinely. Operators shall never leave a cutter unattended as any fire should be caught in incipient stage. If a fire is detected all personnel in the space are to be notified immediately and evacuated. A fire pull station shall be activated upon exiting building along with a call to 978-934-4911 to report fire. No UML personnel are expected to fight the fire and fire extinguishers should only be used by trained individuals.

Safety Guidelines

- *— Radiation Safety Office should be notified before any laser cutters are operated so a safety check can be performed.
- *— All manufacturer instructions are followed. Instruction manual should be located near cutter.
- *— NEVER leave cutter unattended while operating
- *— NEVER defeat interlocks. If there are questions regarding the interlocks contact UML Radiation Safety.
- *— Operators should be familiar with the system and understand the safety measures in place.
- *— Only approved material according to the manufacturer shall be used inside the cutter. PVC can produce chlorine gas and oily or resinous material could start a fire.
- *— Routine maintenance and checks should be performed before each use to assure safety. Materials from previous use must be cleaned before subsequent operation.
- *— Logs should be maintained on who was operating the cutter and what material was used.

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