



# Weekly Safety Briefings

Week 51: December 11<sup>th</sup> – 15<sup>th</sup>, 2023

## *Laser Safety*

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### Introduction

The application of lasers has become standard in many different types of industries. As with any new addition to the workplace, safety should be considered first and foremost. With the proper procedures and safety measures in place, lasers can create excellent innovations to improve all aspects of the job including safety if implemented correctly. This we will look at the hazards associated with laser use, how lasers are classified, and what control measures should be implemented to keep employees safe.

### Monday – The Basics

Just as with everything in the workplace, laser safety is everyone's responsibility. A laser is as safe or hazardous as the user. Of all hazards, complacency is the most dangerous. Proper laser safety management requires a 4-cycle process.

1. Knowledge of the standards
2. Identification of the hazards and risks
3. Implementation of appropriate control measures
4. Consistent program audit to demonstrate compliance

### Tuesday – The Hazards

LASER is an acronym that stands for Light Amplification by Stimulated Emission of Radiation. The laser produces a highly concentrated beam of light. The human body is vulnerable to the output of certain lasers and overexposure can lead to damage to the eyes and skin. The human eyes are the most vulnerable to damage because unlike the skin, there is no external layer of dead cells to provide protection from the environment. Tomorrow we will discuss the different classifications of laser to help understand the level of risk associated with each category.

### Wednesday – Classifications

Understanding the different classifications is vital to ensuring appropriate safety measures are in place prior to use. Today we will give a summary of each classification.

- Class 1: Safe under all conditions for normal use. No PPE required. An example is a laser printer.
- Class 1M: Safe for all conditions except when passed through magnifying optics such as microscopes or telescopes. No PPE required for normal use.
- Class 2: Considered safe because of the blink reflex (glare aversion response to bright lights) will limit the exposure to no more than 0.25 seconds. Intentional suppression of the blink reflex could lead to eye injury. No PPE is required for normal use. An example is a laser pointer.
- Class 2M: Also considered safe due to the blink reflex if not viewed through optical instruments. This applies to beams with a larger diameter or large divergence. No PPE required for normal use.
- Class 3R: Considered safe if handled carefully, with restricted beam viewing. Risk of injury even with overexposure. No PPE is required for normal use. Example is a green pointer.
- Class 3B: Is hazardous if the eye is exposed directly, but diffuse reflections such as those from paper or other matt surfaces are not harmful. Protective eyewear is typically required when direct viewing of the laser beam may occur. Example is a laser inside of a CD or DVD writer.
- Class 4: The highest and most dangerous class of laser. This class of laser is capable of burning the skin and can cause permanent eye damage as a result of direct, diffuse or indirect beam viewing. A Laser Safety Officer must be properly trained and there must be a laser safety program in place with details of all PPE and safety measures required. An example is military grade laser weapons.



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#### Thursday – Control Measures

There are three kinds of controls measures that can be or may be required depending on the types of lasers being utilized in your workplace:

1. **Engineering controls** which are inbuilt safety features supplied by the manufacturer in compliance with the standards. These include but are not limited to guarded footswitch, audible and visible emission indicators, stand-by control, emergency off control, housing interlocks, and beam attenuators.
2. **Procedural controls**, which are policies and procedures pertaining to the job. These are operational activities, specific to equipment and practice, and include but are not limited to: ocular protection and all personal protective equipment required, flammability hazard prevention, controlled access, management of plume, control of electrical hazards, and control of the delivery system and beam emissions.
3. **Administrative controls** are the infrastructure of the laser safety program. These must be in place before the laser can be used and include: A written safety plan that is kept at the laser use site. This should include all policies and procedures, safety set-up checklists, procedure log sheets, verification of education and training of all personnel, credentials roster, documentation forms, audit reports, and materials supplied by the manufacturer regarding operation of the equipment and accessory devices. Everyone involved should become familiar with this plan.

#### Friday – Open Discussion

This week we have covered an overview of laser safety. Now let's open it up to the group to discuss your experiences with laser use in your facility.

- Are lasers currently being used in your work area?
- If so, do you understand the safety standards required and are the safety measures being followed?
- Is there any area laser are being used that require additional safety measures?