



STEVENS INSTITUTE OF TECHNOLOGY LASER SAFETY PROGRAM

SCOPE

This program applies to all lasers and laser systems operated by Stevens Institute of Technology. This program is based on guidance of ANSI Z136.1-2007, *American National Standard for Safe Use of Lasers*. The proper implementation of this program will assure that laser exposures are always below the maximum permissible exposure (MPE) limits.

LASER SAFETY OFFICER

The Laser Safety Officer (LSO) shall have the responsibility and authority to assure compliance with this program. The Office of Environmental Health and Safety serves as the LSO and shall:

- Assure the proper classification of all lasers
- Perform hazard evaluations for all class 3B and 4 lasers and laser work areas
- Specify control measures for all class 3B and 4 lasers and assure implementation
- Approve procedures, SOPs, protective equipment, signs and labels
- Assure that all laser personnel receive appropriate safety training
- Monitor the program and assure compliance
- Maintain program records

The LSO shall have final authority in determining laser control measures and may approve alternate controls when these are appropriate based on the judgment of the LSO. Class 3B and class 4 lasers shall be operated only with the written approval on the LSO. The LSO shall have the authority to terminate laser operations at any time.

The LSO may appoint a Deputy Laser Safety Officer (DLSO) and may delegate duties to the DLSO in accordance with ANSI Z136.1.



LASER CLASSES

Class 1 laser systems are incapable of producing damaging radiation levels during normal operation and are exempt from any control measures. Class 1 laser systems may contain higher class lasers and may produce laser hazards if operated with interlocks defeated. Only authorized personnel may operate class 1 laser systems with interlocks defeated. Operators of class 1 laser systems with embedded class 3B or class 4 lasers shall receive a laser safety briefing.

Class 1M laser systems are incapable of producing hazardous exposure conditions during normal operation unless the beam is viewed with optical instruments. Operators of class 1M laser systems shall receive a laser safety briefing.

Class 2 laser systems emit visible light only at a power level of 1 milliwatt or less. The normal aversion response to bright light is adequate protection. Staring into the beam of a class 2 laser is hazardous. Operators of class 2 laser systems shall receive a laser safety briefing.

Class 2M laser systems emit visible light only. The normal aversion response to bright light is adequate protection for unaided viewing. However, viewing the beam with optical aids is potentially hazardous. Operators of class 2M laser systems shall receive a laser safety briefing.

Class 3R laser systems are potentially hazardous under some viewing conditions, but the probability of an actual injury is small, and the control measures for safe use are straightforward. Most laser pointers fall in this class. Operators of class 3R laser systems shall receive a laser safety briefing. (Most lasers previously classified as class 3a fall in this category.)

Class 3B laser systems are eye hazards for intrabeam viewing and specular reflections, even for momentary exposures, but diffuse reflections are not usually hazardous. Class 3B laser systems shall be operated only in laser controlled areas by authorized operators. Operators of class 3B laser systems shall receive approved laser safety training.

Class 4 laser systems are eye hazards and skin hazards for intrabeam exposures, specular reflections, and diffuse reflections. They are also fire hazards and may produce laser generated air contaminants. Class 4 laser systems shall be operated only in laser controlled areas by authorized operators. Operators of class 4 laser systems shall receive approved laser safety training. A written Standard Operating Procedures (SOP) is required for class 4 laser operation.



TRAINING REQUIREMENTS

All operators of class 1, 1M, 2, 2M, and 3R lasers and laser systems and all incidental personnel or spectators who may be allowed to enter laser controlled areas shall receive a laser safety briefing before operating the laser or entering the controlled area.

All operators of class 3B and 4 lasers shall receive approved laser safety training before operating the laser.

Training is available online by contacting the Office of EHS and obtaining a username and password. Contact EHS at ehs@stevens.edu.

MEDICAL SURVEILLANCE

Baseline eye exams are not required. An eye exam is required immediately following a suspected hazardous exposure. Laser personnel shall report any suspected hazardous exposure to the Office of EHS immediately.

CONTROL MEASURES

All class 3B and 4 lasers shall be operated in a laser controlled area. The requirements for individual laser controlled areas shall be determined by the LSO. The minimum requirements for laser controlled areas are:

- Entryway controls to allow only authorized personnel or approved spectators to enter the laser control area. (Administrative controls are acceptable.)
- Laser safety eyewear available and used in accordance with the SOP for class 4 lasers.
- Beam control (barriers and beam blocks) to limit laser hazards within the controlled area.
- Written SOP for class 4 lasers. (Recommended but not required for class 3B lasers)
- Training of operators of all class 3B and 4 lasers.

EYEWEAR POLICY

Laser safety eyewear is normally required for the operation of class 4 lasers with exposed beams. Laser safety eyewear is normally required for the operation of all class 3B invisible lasers and for class 3B visible lasers with powers greater than 15 mW. Eyewear is not required by policy for class 3B visible lasers with powers of 15 mW or less if other controls are adequate. The LSO will require



eyewear or approve laser operation without eyewear on an individual basis based on a hazard evaluation performed by the LSO.

RESPONSIBILITIES OF EMPLOYEES WORKING WITH LASERS

Employees who work with class 3B or 4 lasers with the beam exposed shall:

- Energize or work with lasers only when authorized to do so.
- Comply with laser safety rules and work procedures.
- Notify their supervisor or the LSO or DLSO in case of potential accident or injury or suspected unsafe condition.

AUDITS

An audit of all class 3B and 4 lasers and the Laser Safety Program shall be conducted annually by the LSO.

RECORDS

The LSO shall maintain records which document the Laser Safety Program. These records shall include:

- Laser hazard analysis reports for all class 3B and 4 lasers
- Training records for all operators of class 3B and 4 lasers
- Standard Operating Procedures for all class 4 lasers
- Approvals of alternate laser control measures
- Laser Safety Audit reports