



The University of Dayton

Laser Safety Program

1. PURPOSE

- a. This program is designed to ensure the safe use of lasers and laser systems at the University of Dayton. Laser safety is essential when the lasers have the potential to cause biological damage to the eye and/or skin. Lasers and laser systems are classified based upon their potential hazard to the eye under normal working conditions. All classes of lasers possess some level of risk. While Class 1, 1M, 2, 2M and 3R have specific labeling requirements, only lasers classified as 3B and 4 shall be registered and managed under this program. Appropriate training and control measures are needed to ensure the well-being of workers who may use or be exposed to laser radiation and/or non beam hazards associated with these laser systems.

2. APPLICABILITY

- a. This policy applies to all faculty, staff, students and employees of the university and research institute that use lasers or may be exposed to laser related hazards.

3. REFERENCES

- a. 29 CFR 1910: Standards for General Industry
- b. 29 CFR 1926.54: Nonionizing Radiation
- c. ANSI Z87.1: Occupational and Educational Personal Eye & Face Protection Devices
- d. ANSI Z136.1: Safe Use of Lasers
- e. ANSI Z136.5: Safe Use of Lasers in Educational Institutions
- f. ANSI Z136.6: Safe Use of Lasers Outdoors
- g. ANSI Z136.8: Safe Use of Lasers in Research, Development or Testing

4. DEFINITIONS

- a. **Authorized Incidental Personnel** – Anyone who does not directly work with but may potentially be exposed to the hazards associated with lasers during the course of their assigned duties. To be considered an Authorized Incidental Personnel they shall complete the baseline eye exam (consisting of the Visual Acuity Test) and safety awareness training. The safety awareness training shall be completed initially and annually thereafter.
- b. **Authorized Laser Personnel** – Anyone who works directly with the hazards associated with lasers during the course of their assigned duties. To be considered an Authorized Laser Personnel they shall complete the baseline eye exam (consisting of the Ocular History, Visual Acuity, Amsler Grid and the Color Vision Tests), safety awareness training (initially and annually thereafter) and be trained on the Standard Operating Procedures specific to each laser system they will be working with.
- c. **Control Measures** – Those materials, policies, and practices employed with the purpose of reducing the possibility of human exposures to hazardous laser radiation and non-beam laser hazards.
- d. **Laser** (Light Amplification by Stimulated Emission of Radiation) – A device that produces radiant energy predominately by stimulated emission.

- e. **Laser Safety Office (LSO)** – The individual who has the authority and responsibility to monitor and enforce the control of laser hazards and effect the knowledgeable evaluation and control of laser hazards.
- f. **Laser Supervisor** – The individual who administratively manages laser systems and authorized laser personnel.
- g. **Laser System** – The laser and associated components that together perform a specified purpose.
- h. **Standard Operating Procedure (SOP)** – Safety procedures specific to each laser system developed and administered by the Laser Supervisor.

5. ROLES and RESPONSIBILITIES

- a. Environmental Health and Safety/ Risk Management Department (EHS/RM)
 - (1) Approve Laser Safety Program and program changes
 - (2) Assist in maintaining a comprehensive Laser Safety Program
 - (3) Services include registration of lasers and laser personnel, initial and periodic laser safety inspections, training, coordination of baseline eye examinations, and provide required laser warning signs
- b. Laser Safety Officer (LSO)
 - (1) Individual responsible for monitoring laser use and safety
 - (2) Administration of the Laser Safety Program at the University of Dayton and management of all related documentation
 - (3) Classify or verify classification of lasers or laser systems used under the LSO's jurisdiction
 - (4) Hazard evaluation of laser work areas
 - (5) Determine the type and level of control measures for lasers and laser systems.
 - (6) Oversee laser safety training
 - (7) Maintain laser inventory and register new lasers and laser workers
 - (8) Perform periodic audits of laser laboratories
 - (9) The LSO will investigate all known or suspected exposure incidents to determine the cause or causes and make recommendations for changes as needed
- c. Department Chair, Division Head and Group Leader
 - (1) Notify the EHS/RM when purchasing, modifying, trading or disposing of Class 3B and Class 4 lasers
 - (2) Ensure that all lasers, laser systems and laser workers are registered with the EHS/RM department
- d. Laser Supervisor
 - (1) Notify the LSO of and laser acquisition, modification, transfer, or disposal. A Laser Registration Form shall be submitted for each new or altered laser
 - (2) Document that all laser personnel have completed the necessary laser safety awareness training and baseline eye exam prior to performing work on any Class 3B and Class 4 laser systems as directed on the Laser Eye Examination Form and return the completed form to the LSO (See Appendix A)
 - (3) Develop safety Standard Operating Procedures (SOPs) for laser and non laser hazards associated with Class 3B and 4 laser systems.
 - (4) Complete In-service SOP training of all laser personnel on the specific laser system(s) on which work is to be performed and forward documentation of the training to the LSO.
 - (5) Assure all laser personnel follow laser SOPs and wear appropriate PPE

- (6) Compose an Incident Report with the assistance of the Laser Worker(s) involved for any known or suspected laser hazard exposure incidents and forward to the LSO
- e. Authorized Laser Personnel
 - (1) Complete and document the University's Laser Safety Awareness Training initially and annually thereafter
 - (2) Complete and document the laser system(s) specific SOP training
 - (3) Complete the appropriate baseline eye examination process and return documentation to the LSO
 - (4) Follow all laser safety procedures and wear appropriate PPE
 - (5) Report any known or suspected exposure incidents to the Laser Supervisor and LSO
 - (6) Assist the Laser Supervisor in composing an Incident Report for any suspected or known laser hazard exposure incidents
- f. Authorized Incidental Personnel
 - (1) Complete and document the University's Laser Safety Awareness Training initially and annually thereafter
 - (2) Complete the appropriate baseline eye examination process and return documentation to the LSO
 - (3) Follow all laser safety procedures and wear appropriate PPE
 - (4) Report any known or suspected exposure incidents to the Laser Supervisor and LSO
 - (5) Assist the Laser Supervisor in composing an Incident Report for any suspected or known laser hazard exposure incidents

6. PROCEDURES

- a. Authorization Laser Training Requirements
 - (1) Laser Safety Awareness Training shall be completed by all individuals identified as Laser Personnel and Incidental Personnel. The Laser Supervisor or Laser Supervisor will assure this training is complete and properly documented. This is an annual training requirement.
 - (2) Laser Personnel who will work directly with the laser systems shall also complete training on the SOP(s) for the specific laser system(s) on which work will be performed.
- b. Authorization Eye Examinations
 - (1) Contact Allied Eye Physicians or your personal eye physician
 - (2) Complete the baseline laser eye examination prior to performing work on any Class 3B and Class 4 laser systems as directed on the Laser Eye Examination Form and return the completed form to the LSO (See Appendix A)
 - (3) A medical examination is required after any suspected laser injury
 - (4) A medical examination is required at termination
- c. Laser Inventory and Registration
 - (1) All Class 1, 1M, 2, 2M, 3R, 3B and 4 lasers shall be inventoried and submitted to the LSO
 - (2) All Class 3B, Class 4 Lasers and Laser Personnel shall be inventoried and registered with the LSO (See Appendix A)
- d. Laser Exposure Incidents
 - (1) Medical attention shall be sought by individuals known or suspected to have been exposed to laser radiation or non-beam hazards in the laser use area

- (2) Report any known or suspected exposure incidents to the Laser Supervisor and LSO
 - (3) An incident report shall be generated by the Laser Supervisor and submitted to the LSO
 - (4) The LSO will investigate all known or suspected exposure incidents to determine the cause or causes and make recommendations for changes as needed
 - (5) All recommended changes to laser safety procedures and controls resulting from laser incident investigations shall be implemented by the Laser Supervisor and followed by the laser workers
- e. Record Keeping
- (1) Online Laser Safety Awareness Training records will be maintained by EHS/RM
 - (2) Eye examinations records will be maintained by EHS/RM and the LSO
 - (3) SOP Training records will be maintained both by the Laser Supervisor and LSO
 - (4) Laser, Laser System and laser personnel registration will be maintained by the LSO and EHS/RM
 - (5) Laser system audits and inspections will be maintained by the LSO
 - (6) Laser exposure incident reports and recommendations will be maintained by EHS/RM and the LSO

Appendix A

Laser Safety Program Forms

LASER REGISTRATION FORM

Instructions: All Class 3b and 4 lasers are required to be registered with the UD/UDRI Laser Safety Officer. Complete all sections of this form for each laser to be registered and forward to: **Acting Laser Safety Officer: Denny Gault, 937-229-3056, dennis.gault@udri.udayton.edu**

Division/Department: _____ Group: _____

Principal Investigator: _____ Phone: _____

Laser Manufacturer: _____

Model Number: _____

Serial Number: _____

Laser Location: _____

Facility

Building

Room Number

Laser Type (Nd:YAG, etc): _____

Classification (3b or 4): _____

Wavelength (nm): _____

Beam Diameter (mm): _____

Beam Divergence (mrad): _____

☐ Continuous Wave: _____ average power (Watts): _____

or

☐ Pulsed: energy _____ Joules per pulse pulse repetition frequency (Hz) _____

or

☐ Q-switched pulse width _____ energy _____ Joules per pulse

Purpose or Use: _____

Comments:

Identify individuals who work directly with this laser:

Identify individuals who may potentially be exposed to the hazards associated with this laser during the course of their assigned duties:

Principal Investigator's Signature
(no signature needed for electronic format)

Date