

Sample Standard Operating Procedure

Class 3B or 4 Lasers



I. Scope

- A. This document provides safety guidance for laser operators and spectators within the laser controlled area.
- B. Procedures reflected herein are in accordance with applicable regulation parameters impacting the operation of the laser laboratory.

II. Responsibilities

- A. _____ is responsible for the safety of this laboratory operation in conformance with this Standard Operating Procedure (SOP). In his/her absence, _____ shall assume these responsibilities.
- B. Only trained laboratory personnel and maintenance personnel from manufacturers may energize the laser or laser system

III. Hazards

- A. Laser hazards from class 3B lasers consist of eye hazards from direct or reflected laser beams. Diffuse reflections (scattered light) are not hazardous.
- B. Laser hazards from class 4 lasers consist of eye and skin hazards from direct, specular, or diffuse reflections. Also a fire hazard, and may produce laser generated air contaminants and hazardous plasma radiation.

IV. Control Measures

- A. Class 3B and 4 lasers may be operated with the beam exposed only in laser controlled areas except for specific test procedures approved by the LSO.
- B. Class 3B and 4 lasers may be operated only when mounted in a mount approved by the LSO and with the beam terminated in a manner approved by the LSO. Laser personnel must control the beam path to prevent misdirected or reflected beams and must not allow reflective or shiny objects in or near the beam path.
- C. Laser safety eyewear is required for open beam invisible class 3B and 4 lasers. All laser safety eyewear must be approved by the LSO. Eyewear is recommended for visible class 3B lasers for procedures that are not part of the normal test sequence or are not well documented.

V. Beam Alignments

- A. Secure all entrances into the laser area.
- B. Locate all equipment and materials needed prior starting alignment.
- C. Use laser protective eyewear with proper OD and wavelength for alignment. Use skin covers (lab coat, gloves, and UV face shield) to protect users from UV laser beam scatter.
- D. Intrabeam viewing must always be avoided. Whenever possible use a low power alignment laser (class 2 or 3A), if none is available, use the lowest beam power available.
- E. If there are others in the room make sure they are aware of the alignment in progress.
- F. Keep optical table(s) clear of objects which may cause unwanted reflections. Close laser shutter if entering the beam path is necessary.
- G. Insure all beam blocks, enclosures, and beam barriers are replaced when the alignment is complete.

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VI. Laser Controlled Areas

- A. The laser hazards associated with this laboratory have been analyzed, and the controls specified for these hazards will reduce the risk to employees and the environment to acceptable levels.
- B. All entries into the laser controlled area must be posted with the proper warning sign.
 - 1. Do not rely on closed doors as adequate security. Use key locks or activated interlocks on doorways into the laser area.
 - 2. When the laser is energized, all entrances into the laser controlled area must be secured to prevent unauthorized access. If there is a “laser on” indicator it must be used.
- C. An emergency procedure sign must be posted inside the laser controlled area along with this laser safety plan/standard operating procedures near the laser or laser system.
- D. The laser beam shall be contained in the immediate area using non-reflective and non-flammable beam blocks and/or partitions.
- E. It is the discretion of the laser operator to allow or deny entry into the laser area while the laser is energized.
- F. If there are windows in the laser area, they must be blocked with opaque material that is non-reflective and non-flammable.
- G. If possible position the laser so it is not at standing or sitting eye level.
- H. If the laser/laser system is key operated; do not leave the key in the laser when the experiment is finished.

VII. Non-beam Hazards

- A. Laser dyes should be handled with care and proper protective equipment must be used (lab coat, safety glasses and gloves). If dyes are to be mixed, it must be done in a well ventilated fume hood. Dye pumps and storage must be in secondary containers.
- B. When working with high voltage, the “buddy” system should always be used. Trained CPR laboratory personnel are highly recommended.
- C. Compressed gas cylinder must be secured properly and staff should be trained with the proper hazards and handling of the various gases.
- D. Attention should be given to protect against fire, especially with class 4 laser/laser system. Flammable solvents may be used in laser dyes or to clean components. Fire extinguishers (charged properly) should be kept in the laser area and staff should know how to use them.
- E. Good general house keepings can greatly improve safety from physical hazards. Cables should be secured to keep trip hazards to a minimum.

VIII. Laser Maintenance

- A. Only properly trained and PI approved personnel may service laser systems.
- B. All enclosures, interlocks, and safety devices must be replaced and verified operational prior to returning the laser to regular use.

IX. Training

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	University of Wyoming Safety
	Web: www.uwyo.edu/safety/
	Phone: (307) 766-3277
	Email: uwehs@uwyo.edu
Regulated Materials Management Center	
Phone: (307)766-3698 Fax: (307)766-3699	
Email: HAZMAT@uwyo.edu	

- A. Individuals who use this equipment are required to take the UW EHS Laser Safety Class and shall be trained to recognize the intrinsic hazards, are aware of basic safety information that relates to their job duties, and know the safe operating requirement for this activity.
- B. All operating personnel shall read and understand this standard operating procedure (SOP) and all applicable references stated in this SOP. Signatures of all authorized operators are required at the end of this SOP.

X. Emergency Procedures

- A. In an event of a laser emergency refer to the Laser Emergency Procedure posted in the laser controlled area.
- B. In an event of fire or other emergency, evacuate and notify the UW Police department by dialing 911.

XI. Additional Safety Measures
