

## **Class 4 LASER SOP Guidelines**

The ANSI Z136.1 standard for the safe use of lasers requires a written standard operating procedure (SOP) for activities requiring access to class 4 laser beams. An SOP for laser equipment is usually a concise document that gives general safety guidelines instead of specific, step-by-step instructions. The following sections are recommended for inclusion in your SOP's in any format that meets individual needs.

### **SYSTEM DESCRIPTION**

- Location of laser (site, building, room)
- Laser type and ANSI Z136.1 classification
- Intended application and minimum possible power to meet requirements
- Description of laser (wavelength, power of CW lasers, energy per pulse, pulse duration and repetition rate of pulsed lasers, output beam diameter and shape, and beam divergence)

**HAZARDS.** List the hazards, eye and skin hazards from direct or scattered radiation, electrical, chemical, and any other recognized hazards associated with the laser.

**CONTROLS.** For each hazard listed above, briefly state the control measures to be used. It is important to include the following in this section:

- Include the specific type of eyewear that is provided.
- Describe the laser controlled area and entryway controls.
- A reference to the equipment manual.
- Either alignment guidelines or a reference to the manufacturers guidelines.

### **OPERATING PROCEDURES**

- Initial preparation of laboratory environment (key position, warning lights on, interlock activated, identification of personnel)
- Personal protection (eyewear, isolation, barrier)
- Target preparations
- Countdown procedures
- Shutdown procedures

TRAINING REQUIREMENTS. The specific training requirements of approved personnel should be stated.

- Indoctrination of operating personnel (laser specific)
- General laser safety training

#### EMERGENCY PROCEDURES

- List potential emergencies and corresponding actions (include emergency contact)
- Describe specific rescue/evacuation procedures

Approved Personnel. List by name all individuals who are approved to operate the laser in a class 4 mode without supervision. This may be an attachment to the SOP.

Note: A hazard evaluation is required by ANSI. This should be kept on file by the LSO. It may be attached to the SOP.

### **Alignment Guidelines Recommended for Class 3b and Required for Class 4 LASERS**

1. Allow only trained personnel to be present during alignment.
2. Minimize the number of personnel present during alignment.
3. Assure that all personnel wear appropriate laser protective eyewear.
4. The person who turns on the laser is responsible for the beam.
  - Check personnel for eyewear
  - Know where the beam is going
  - Give an audible warning
5. Where feasible, use low power (Class 2 or 3a) visible lasers to simulate the path of high power and/or visible lasers.
6. Where feasible, terminate laser beams and specular reflections on diffuse reflecting beam blocks.
7. Use phosphor cards (Nd:YAG), IR viewers, video cameras, thermal paper, or other beam display devices to locate invisible beams.
8. Locate any specular reflections of the beam and block them as near their source as possible.
9. Whenever possible, reduce all high power laser beams to the minimum possible power.
10. Use beam shutters to block high power beams any time they are not actually needed.