**University of South Carolina**

**Radiation Safety Office**

**Laser Use Application**

The Radiation Safety Committee is a Special Advisory Committee, appointed by the President and the administrative offices, to oversee campus operations through the service of faculty, staff and students. The Radiation Safety Committee has developed the University’s laser safety policy in accordance with the American National Standard Institute’s Standard for the Safe Use of Lasers (ANSI Z136.1), which is the laser industry’s standard for all persons who operate Class 2, Class 3, and Class 4 laser products. (The previous designations were Class I, Class II, Class IIIA, IIIB, Class IV and are approximately equivalent Class 1, Class 2, Class 3R, Class 3B, and Class 4, respectively.)

Laser classifications are normally determined by the manufacturer and labeled on the device. If you cannot find this information, or for home-built or modified devices, you can find guidance in the USC Radiation Safety Manual, available on-line at http://www.sc.edu/ehs/Radiation/laser.htm. The Radiation Safety Office can also assist in classifying a laser.

# **Low-power laser safety (Class 1, 1M, 2, 2M, and 3R):**

Class 1, Class 2, and Class 3R lasers pose relatively little risk; however, hazards do exist from prolonged exposure or carelessness. The PI must take responsibility for identifying hazards in their work group, for training users to minimize risks and for ensuring that users follow safe practices. Registration with the Radiation Safety Office is not required, except in special circumstances covered below. However, please contact the Radiation Safety Office if you have any concerns about the safe use of your device.

# **Examples of lasers that do not require registration:**

* Laser pointers
* Lasers embedded in printers, audio or visual devices
* Pieces of equipment that contain Class 3B and Class 4 lasers, such as confocal microscopes, may be classified as Class 1 if the beam is inaccessible under normal use and can only be serviced by a manufacturer’s representative. The laser beam must remain inaccessible to University personnel.

# **Class 1, 1M, 2, 2M, and 3R lasers that require registration:**

* Any laser that students will use in a classroom or teaching lab.
* Any use of a laser with deliberate eye exposure to human beings.
* Any laser use where there is a foreseeable risk of unintended eye exposure through focusing optics (e.g., a direct viewing microscope).
* Any system must be registered according to the classification of its internal components if it is to be serviced by USC personnel such that the user has a potential for exposure to the beam.

**ALL Class 3B or Class 4 lasers must be registered if accessible by University personnel.**

# **Initial Laser Use Registration:**

This application must be completed and approved by the Radiation Safety Committee prior to operating a laser described above. Hazards must be identified and a program to reduce risks must be developed.

**Principle Investigator (PI):**

Name:

Title: Email:

Phone #: Office Location:

Department:

**PI Previous Training:**

Describe the nature of the PI’s training in laser use and safety. Please include dates and locations. Include a copy of any formal documentation.

**Laboratory Information (where laser will be utilized)**

**Location:** Building: Lab Room Number:

**Laboratory Laser Safety Officer (LLSO):** (LLSO will be the point of contact for Radiation Safety personnel.)

Name: Email:

Phone Number: Office Location:

USC Basic Laser Safety Training Date:

Other Laser Safety Training Date: (Must provide documentation)

Responsible for: New personnel training Laser inventory maintenance

New personnel eye exams Updating RSO when changes in device usage are made

**Complete the table below for lasers that meet a Special Circumstance and all 3B and Class 4 lasers. For additional lasers, please duplicate this page as needed.**

|  | **Laser 1** | **Laser 2** | **Laser 3** | **Laser 4** | **Laser 5** |
| --- | --- | --- | --- | --- | --- |
| **Location** |  |  |  |  |  |
| **Manufacturer** |  |  |  |  |  |
| **Model #** |  |  |  |  |  |
| **Serial #** |  |  |  |  |  |
| **Type1** |  |  |  |  |  |
| **Class** |  |  |  |  |  |
| **Wavelength** |  |  |  |  |  |
| **Mode2** |  |  |  |  |  |

**Maximum Specifications (as applicable)**

|  | **Laser 1** | **Laser 2** | **Laser 3** | **Laser 4** | **Laser 5** | |
| --- | --- | --- | --- | --- | --- | --- |
| Pulse Duration (Pulsed laser) |  |  |  |  |  |
| Pulse Frequency (Pulsed laser) |  |  |  |  |  |
| Pulse Energy  (Pulsed laser) |  |  |  |  |  |
| Average Power (Continuous Wave laser) |  |  |  |  |  |
| Max Power (Continuous Wave laser) |  |  |  |  |  |
| **Beam Diameter** |  |  |  |  |  |
| **Beam Divergence** |  |  |  |  |  |
| **Eyewear OD3** |  |  |  |  |  |
| **Additional PPE required**  **(list PPE)3,4** |  |  |  |  |  |

1Type: Argon, Nd:YAG, etc.

2Mode: Pulsed- Single Pulse (SP), Repetitively Pulsed (RP), Q-Switched (QS), Mode Locked (ML) Continuous Wave (CW)

3Eyewear and PPE must be provided by the PI without charge to the authorized users and be maintained in good working order.

4Include PPE for protection against hazards other than eye exposure involved in the operation of the laser, for example, heat, debris, chemicals, etc.

**Laser Set-ups**

Submit a diagram of the laboratory and the location of each laser. Please attach to this form and use additional sheets as needed.

**User Training:**

• All operators must complete the Basic Laser Safety Training Course provided online at https://www.sc.edu/ehs/Radiation/Lasertraining.htm and pass the written exam given at the Radiation Safety Office at 306 Benson School.

• After course completion, all operators are required to have an eye exam paid for by the Radiation Safety Office.

• Refresher training by the PI is required annually and documented in January.

**Describe any additional safety training of users within the workgroup.**

**Identify the most likely scenarios that would lead to an inadvertent eye exposure of the laser users to the laser beam.**

**Describe features of the laser or group policies that limit the inadvertent eye exposure of laser users to the laser beam.**

**Describe features of the laser or group policies that limit the inadvertent eye exposure of unauthorized personnel.**

**List special hazards associated with the laser other than eye exposure [e.g., LGAC (Laser Generated Air Contaminants), thermal burns, UV burns, large capacitors, high voltage power supplies, cryogens, compressed gases, hazardous chemicals, high noise levels].**

**Describe features of the laser or group policies that limit the potential harm from these special hazards.**

**For Radiation Safety Office Use:**

Registration #: Date of Registration:

Comments:

**Submit Standard Operating Procedures to include operating, alignment and emergency procedures for each laser on this application. These procedures must be maintained in your logbook at all times. The following are examples of issues that will typically need to be included.**

# Operating Procedures:

Turn on “Laser In Use” sign.

Ensure area is secured when laser is in use.

Notification of all lab personnel that laser will be in use.

Assure appropriate safety equipment is on hand. Specify what safety equipment is necessary:

Safety goggles with specific OD

Sunscreen

Lab coat

## Start up:

Verify “Laser In Use” sign is On.

Include:

Don protective equipment.

Inserting key.

Turning on power supply.

Closing shutter.

Activating laser.

## Shut down:

Include:

Steps to shut down system.

Remove protective equipment.

Turn light box off.

Remove key to proper location.

Remove protective equipment to proper location.

# Alignment Procedures:

Assure appropriate safety equipment is worn.

Goggles with specified OD

Sunscreen

Lab coat

Specify what equipment will be used for alignment.

Inspect equipment prior to use.

Use buddy system when performing alignment.

Assure optical table remains clear of obstructions and reflective objects

Remove jewelry

Turn laboratory lights on

List specific steps taken during alignment procedure to include:

Turn on light box.

Don protective equipment.

Remove jewelry.

Insure all beam blocks, enclosures and barriers are secured in place.

# Emergency Procedures:

List emergency procedures specific to the laboratory. Include:

Type of emergency (fire, medical, etc.)

Procedure for evacuation,

Locations of safety equipment (eye wash, shower, fire extinguisher)

Location of emergency shut off switch

Emergency contact information (PI phone #. LLSO phone #, USCPD phone #, Radiation Safety Officer phone # 777-5269.