

# Laser Standard Operating Procedure (LSOP)

## Introduction

All Principal Investigators that use lasers are required to write standard operating procedures (LSOP) for all laser operations involving Class 4 lasers detailing operation, alignment and maintenance procedures for each laser. The LSOP should be available to all laser users in the laboratory. For Class 3B, SOP is a recommendation as per ANSI Z136.1.

This LSOP shall address specific safety considerations during normal operations, beam alignment, servicing and any non-beam hazards that might exist. Please refer to the USC laser safety manual and the laser safety training as well as ANSI Z136.1 2014, which is available by contacting EH&S at 323-442-2200. This SOP does not take the place of site- specific laser safety training associated with the mentioned lasers below, nor the Laser Safety Training offered by the EH&S. Documentation of laser safety training should be placed in the Laser Safety Binder maintained by lab.

## Definition:

**Nominal Hazard Zone (NHZ)** – The area where the laser radiation can cause damage to the eye or body, i.e. where laser radiation exceeds the maximum permissible exposure.

**Maximum Permissible Exposure (MPE)** – The level of laser light to which a worker may be exposed with no risk of injury.

**Laser Controlled Area (LCA)** – Designated as the controlled access area for the laser system. Laser radiation in this area must not exceed the MPE. The LCA must be only accessible and operated by authorized and trained personnel. It must also be labelled with appropriate warning signs.

**Online Calculator:** <http://lasersafetyu.kentek.com/easy-haz-laser-hazard-software-basic-web-version/>

**Optical Density (OD) Calculator:** <https://www.lia.org/evaluator/od.php>

## LASER SYSTEM INFORMATION

Laser	Laser 1	Laser 2	Laser 3	Laser 4
Laser Serial#				
Laser Medium				
Laser Class				
Laser Manufacturer				
Laser Model				
Location of Laser				
MPE				
NHZ				

## 1. LASER LAYOUT

Attach a diagram of area layout as well as a digital photograph of all Class 4 lasers in the lab indicating LCA.

## 2. CONTROL MEASURES

**LASER/LASER SYSTEM CONTROLS** (Please explain if you do not have the controls in place)

Y/N	CONTROL	COMMENTS
	Entryway (door) Interlocks or controls	
	Laser enclosure interlocks	
	Laser housing interlocks	
	Emergency STOP/Panic button	
	Master switch (operated by key or code)	
	Laser secured to base	
	Beam stops/ beam attenuators	
	Protective barriers	
	Warning signs	
	Reference to equipment manual	
	Extra eyewear available	

### HAZARDS AND CONTROLS CHECKLIST

Y/N	HAZARD	CONTROL MEASURES IMPLEMENTED
	Unenclosed beam/ access to direct or scattered light	
	Laser at eye level of person sitting or standing	
	Ultraviolet radiation/Blue light exposure	
	Reflective material in beam path	
	Hazardous materials/waste (dyes, solvents, other)	
	Fumes/Vapors	
	Electrical	
	Capacitors	
	Compressed gasses	
	Fire	
	Trip Hazard	

Comments:

### 3. PERSONNEL PROTECTIVE EQUIPMENT

Please include all PPE that would be used in LCA. Review your application and be certain you have selected eyewear of appropriate OD (optical density) for the wavelength and power levels. Users are responsible for selection, purchase and appropriate use of eyewear.

Other protective equipment required within the Nominal Hazard Zone

PPE	STORAGE LOCATION	USAGE CONDITION

### 4. ALIGNMENT PROCEDURES

The lab is responsible for laser beam alignment.                      Yes                      No

If yes, complete Laser Beam Alignment Procedure form.

### 5. OPERATING PROCEDURES (add additional information based on your application)

Primary steps:

- Remove jewelry that might reflect beams.
- Obtain appropriate eyewear. Be certain it is of appropriate OD for the wavelength(s) in use.
- Turn on outside warning light.
- Inspect optical setup for recent changes/and or foreign objects.
- Verify that all personnel in lab are wearing approved eyewear.
- Issue verbal warning prior to starting laser.
- Insert key into laser controller.

Please write down procedural steps from start to end of a procedure. Include procedure for emergencies. Attach the specific SOP document for each laser system to this form.

**Laser User acknowledgement:**

I have read and understood this procedure, its content, the EHS review below and attached addendum. I agree to follow this procedure each time I use the laser/laser system. Please be certain to read any addendums to this SOP prior to signing!

NOTE: All laser users should read the specific SOP for lasers and sign below.

Name	Signature	Date

**EHS review:**

Reviewed by (EHS)

Name:

Title:

Date: