Laser Safety Guidelines & Requirements
Lasers Require Special Safety Procedures to be Followed During Their Use and Maintenance

American National Standards Institute (ANSI):
ANSI has set the general and clinical standards for the safe use of lasers and the Laser Institute of America serves as the secretariat for lasers under ANSI Accredited Standards Committee Z136. ANSI Standard Document: Z136.1-2014, American National Standard for Safe Use of Lasers is the base document that pertains to all lasers used in the USA. ANSI Standard Document: Z136.3-2011, American National Standard for Safe Use of Lasers in Health Care further defines the requirements for the safe and effective use of lasers in the health care that includes home use and all dental and medical facilities.


- Scope & Requirements for Laser Safety
- Laser Classifications
- Definitions and Laser Terminology
- Measurement Standards
- Hazard Evaluation
- Criteria for Exposures of Eye and Skin
- Personal Protective Equipment
- Education and Training
- Incident Reporting Mechanism
- Engineering Controls
- Labels and Signage
- Laser Safety Officer (LSO)

ANSI Standard: Z136.3-2011, American National Standard for Safe Use of Lasers in Health Care

- Biological Hazards
- Eye ware & Personal Protective Equipment
- Healthcare Personnel Laser Training
- Incident Reporting Mechanism
- Health Care Laser Systems Engineering Controls
- Infection Control for Health Care Laser Systems
- Pathogens in Laser Generated Airborne Contaminates
- Health Care Facility Laser Safety Officer(s) (LSO)

FDA / ANSI Required Engineering Controls (The Laser Device’s Safety Mechanisms):

- Protective Case Interlock
- Fiber Interlock
- Warning Labels on Device
- Software Diagnostic Self-Test
- Laser Stop Button
- Beam Path Control
- Guarded (or Recessed) Activation Control Switch
- Visual & Audible Laser Energy Emission Signal
- Device Locking Mechanism (Key or Password)
- Automatic (Time-out) Sleep Mode

Laser Safety Officer (LSO) Role & Responsibilities:
All facilities where Class 4 lasers are in use are Required to have a designated Laser Safety Officer (LSO). Some states require that the Laser Safety Officer is formally trained and registered with the state’s regulatory agency. The LSO does Not have to be the dentist and is very often a clinical auxiliary.

The LSO is the person responsible for the laser safety program for the dental facility. This individual must have the training and experience to establish and administer the laser safety program and education for the other personnel within the facility. The LSO is responsible for monitoring and overseeing the control of laser hazards. The LSO shall oversee the evaluation and control of laser hazards by utilizing, when necessary, the most appropriate clinical and technical support staff and other resources. The LSO either performs the stated tasks or ensures that the tasks are performed by qualified individual(s); and may delegate specific responsibilities.

The Laser Safety Officer’s Responsibilities Include:
- Being the office’s “expert” on the care, maintenance, and the safe operation of the lasers that are being used.
- Verifying the classifications of the lasers and laser systems used within the facility.
- Ensuring that all appropriate protocols and SOPs have been established and are properly being followed.
- Overseeing and ensuring that all personnel are appropriately trained on the laser’s use and safety.
- Ensuring that all of the required labels and signs are appropriate and are in place.
- To ensure that the laser protective eyewear and other devices are appropriate and in good condition.
- Controlling the laser’s key and / or manage the passwords for activating the laser.
- To periodically audit and inspect the presence and functionality of the laser systems and their safety features.
- Participate in investigating any laser related accident and to report any significant laser related injury to the laser’s manufacturer when deemed appropriate.
- Assuring that the necessary records required by applicable government regulations are maintained. (Documenting the maintenance of the safety programs, such as training records, audits, SOP, etc.)
- Overseeing the Deputy Laser Safety Officer (DLSO) and Laser Safety Site Contact (LSSC), if those positions are deemed necessary for the dental facility.
ANSI Laser Classifications & Requirements

Class 1 Laser System
Any laser or laser system containing a laser that cannot emit laser radiation at levels that are known to cause eye or skin injury during normal operation.

Class 1M Laser System
Considered incapable of producing hazardous exposure unless viewed with collecting optics.

Class 2 Laser System
Visible lasers considered incapable of emitting laser radiation at levels that are known to cause skin or eye injury within the time period of the human eye aversion response (0.25 seconds).

Class 2M Laser System
Emits in the visible portion of the spectrum, and is potentially hazardous if viewed with collecting optics.

Class 3R Laser Systems
A laser system that is potentially hazardous under some direct and specular reflection viewing condition if the eye is appropriately focused and stable.

Class 3B Laser Systems
Medium-powered lasers (visible or invisible regions) that present a potential eye hazard for intrabeam (direct) or specular (mirror-like) conditions. Class 3B lasers do not present a diffuse (scatter) hazard or significant skin hazard except for higher powered 3B lasers operating at certain wavelengths.

Class 4 Laser Systems (ALL DENTAL & MEDICAL SURGICAL LASERS)
High-powered lasers (visible or invisible) considered to present potential acute hazard to the eye and skin for both direct (intrabeam) and scatter (diffused) conditions. Also have potential hazard considerations for fire (ignition) and byproduct emissions from target or process materials.

American National Standard Requirements for Lasers by Classification

<table>
<thead>
<tr>
<th>Class</th>
<th>Controls Measures</th>
<th>Training</th>
<th>Laser Safety Officer (LSO)</th>
<th>Engineering Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not Required</td>
<td>Not Required</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>1M</td>
<td>Required</td>
<td>Application Dependent</td>
<td>Application Dependent</td>
<td>Application Dependent</td>
</tr>
<tr>
<td>2</td>
<td>Not Required</td>
<td>Not Required</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>2M</td>
<td>Required</td>
<td>Application Dependent</td>
<td>Application Dependent</td>
<td>Application Dependent</td>
</tr>
<tr>
<td>3R</td>
<td>Not Required</td>
<td>Not Required</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>3B</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>4</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
</tbody>
</table>

1. American National Standard (ANSI) for the Safe Use of Lasers Z136.1-2014 Table 1.1; Laser Institute of America; Publisher

Copyright © 2014 Advanced Integration & Mentoring (LSG2-1401-1)
**Laser Safety Guidelines & Requirements**

**Control Measures & Laser Beam Hazards**

**Potential Ocular (Eye) Damage from Laser Light Energy:**

<table>
<thead>
<tr>
<th>Wavelengths with the Potential of Causing Ocular Damage</th>
<th>Ocular Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>400nm to 1,400nm (Visible &amp; Near Infrared)</td>
<td>Retina</td>
</tr>
<tr>
<td>1,400nm to 3,000nm (3.0µ) (Near Infrared)</td>
<td>Lens</td>
</tr>
<tr>
<td>1,400nm to 1mm (Near, Mid, &amp; Far Infrared)</td>
<td>Aqueous Humor</td>
</tr>
<tr>
<td>3,000nm (3.0µ) to 1mm (Mid &amp; Far Infrared)</td>
<td>Cornea</td>
</tr>
</tbody>
</table>

**Protective Eyewear:**
- **ALL** Class 3B and Class 4 lasers **REQUIRE ALL PERSONS** in the NHZ to wear Laser Protective Eyewear.
- The FDA requires that Operators Manual must state the minimum Optical Density (OD) or Laser Filtration (L) required of the Laser Protective Eyewear for the Wavelength of the laser in use.
- The Optical Density (OD) / Laser Filtration (L) for the wavelength (WL) in nanometers (nm) covered is required to be designated on the eyewear to insure they provide the proper filtration & protection for the laser energy.

**Protective Eyewear MUST Be Worn by Everyone in the NHZ (Operatory) when the ANY Class 3B or 4 Laser is in Use.**

**Nominal Ocular Hazard Distance (NOHD):**
- The **Nominal Ocular Hazard Distance (NOHD)** is the distance from where a laser is firing that there is the potential for damage to the eye if the emitted laser energy were to strike the eye.
- The NOHD is specific for each model of the laser and must be specified for each device.
  - Example: NOHD for the Sirona SIROLaser laser is 5 feet (1.5 meters)
  - NOHD for the Ivoclar Navigator laser is 13 Feet (154.55 inches)
  - NOHD for the ezLase by Biolase is 38 feet 8 inches (11.8 meters)

  The NOHD is determined by following parameters; the laser’s Wavelength, the laser’s Maximum power, and of the laser and the laser’s beam divergence.
  - Divergence is determined by the laser’s delivery mechanism of the emitted laser energy.
  - Different brands / types of fibers will have different beam divergence and therefore have a significant effect on establishing the NOHD for the emitted energy.

**Nominal Hazard Zone (NHZ):**
- The **Nominal Hazard Zone (NHZ)** is the area within the Nominal Ocular Hazard Distance (NOHD) unless the emitted laser energy is blocked by an obstruction that the emitted laser energy cannot pass through, such as a wall. (Remember that most laser energy is invisible to the human eye and can pass through glass and similar mediums that do not contain the proper filtering or blocking components in it.)
- **NHZ** is specific for each laser & is determined by NOHD of the laser being used.
- **Nominal Hazard Zone (NHZ)** is Essentially the Entire Operatory.
- The NHZ must be designated with appropriate signage specifying: Classification, potential danger, wavelength, & power of the laser, OD of the LPE required & the name of the LSO.
- NHZ area should be restricted to the patient and only necessary personnel.
- Reflective surfaces within the NHZ should be reasonably minimized.
- **All persons in the NHZ must wear appropriate eye protection for ALL CLASS 3 and 4 LASERS.**

![Laser Safety Guidelines & Requirements](Image)
Laser Safety Guidelines & Requirements

Control Measures & Laser Beam Hazards (continued):

Required Warning Signs and Device Labeling for Class 4 Lasers:

Device Labeling for Class 4 Lasers:
All Class 4 laser devices are required to be labeled in accordance to the above ANSI standards which has been used to establish and the FDA’s Federal Laser Product Performance Standard (FLPPS). All laser warning labels shall be conspicuously displayed and in a suitable font and symbol size to be easily read and recognized. The laser device must be regularly inspected to insure that the required labels are present and legible.

The laser device shall have equipment labels that includes the following information:
- The laser radiation symbol (a yellow equilateral triangle with a black sunburst in the center
- Stating the laser device in a Class 4 laser system
- The emitted wavelength
- The maximum output
- A precautionary statement for users stating:
  - Laser Radiation:
    - Avoid Eye Exposure to Direct or Scattered Radiation
    - Avoid Skin Exposure to Direct Radiation

Below are the labels on the SIROLaser Advance Laser (these type of labels are required on all Class 4 lasers):

---

1 American National Standard for Safe Use of Lasers ANSI Z136.1-2014; Section 4; Laser Institute of America, Publisher
2 American National Standard for Safe Use of Lasers in Healthcare ANSI Z136.3-2011; Laser Institute of America, Publisher
3 American National Standard Specifications for Accident Prevention Signs ANSI Z535.1

Copyright © 2014 Advanced Integration & Mentoring (LSG4-1401-1)
Laser Safety Guidelines & Requirements

Laser Controlled Area Warning Signs
“The purpose of a laser area warning sign is to convey a rapid visual hazard-alerting message that:

a) Warns of the presence of a laser hazard in the area
b) Indicates specific policy in effect relative to laser controls
c) Indicates the severity of the hazard (e.g., class of laser, NHZ extent)
d) Instructs appropriate action(s) to take to avoid the hazard (eyewear requirements, etc.)”

Location of Laser Controlled Area Warning Signs. “All signs shall be conspicuously displayed in locations where they best will serve to warn onlookers.” Laser Area Warning Signs must be placed at every entrance into the Nominal Hazard Zone (NHZ / Operatory) and should only be displayed when the laser is in use.

The appearance of the laser warning sign for a Class 3B or Class 4 laser:
“Laser controlled area warning signs shall be of the three panel format unless additional panels are needed for a second language. The top panel shall contain the safety alert symbol as well as the signal word. The other two panels shall contain the laser radiation hazard safety symbol and the message panel.”

• Safety Alert Symbol. “This is a symbol which indicates a potential personal safety hazard. It shall be composed of an equilateral triangle surrounding an exclamation mark, conforming with ANSI Z535.3. The symbol shall be located to the left of the signal word.”

• Signal Words. The signal words have the following meanings:
  • “DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme conditions.”
  “The signal word “Danger” indicates that death or serious injury will occur if necessary control measures are not implemented and used to mitigate the hazards within the laser controlled area. This signal word shall be restricted to those Class 4 lasers with high (e.g., multi-kilowatt) output power or pulse energies with exposed beams.”

  • “WARNING indicates an imminently hazardous situation that, if not avoided, could result in death or serious injury.”
  “The signal word “Warning” shall be used on laser area warning signs associated with lasers and laser systems whose output exceeds the applicable MPE for irradiance, including all Class 3B, and most Class 4 lasers and laser systems.”

  • “CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to “NOTICE.”
  “The signal word “Caution” shall be used with all signs and labels associated with Class 2 and Class 2M lasers and laser systems that do not exceed the applicable MPE for irradiance.”

  • “NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol shall not be used with this signal word. As an alternative to “NOTICE,” the word “CAUTION” without the safety alert symbol may be used to indicate a message not related to personal injury. This signal word shall not be associated directly with a hazard or hazardous situation and shall not be used in place of “DANGER,” “WARNING,” or “CAUTION.”

1 American National Standard for Safe Use of Lasers ANSI Z136.1-2014; Section 4.6

Copyright © 2014 Advanced Integration & Mentoring, Inc., (LSG5-1401-1)
Laser Safety Guidelines & Requirements
(continued)

Laser Controlled Area Warning Signs (continued):

Signal Word Panel.

- **Warning signs** should have the signal word “WARNING” in black letters on a rectangular orange background placed at the top of the sign. The safety alert symbol shall precede the signal word. The base of the symbol shall be on the same horizontal line as the base of the letters of the signal word. The height of the safety alert symbol shall be equal to or exceed the signal word letter height.

- **Danger signs** shall have the signal word “DANGER” in white letters on a rectangular safety red background placed at the top of the sign. The safety alert symbol shall precede the signal word. The base of the symbol shall be on the same horizontal line as the base of the letters of the signal word. The height of the safety alert symbol shall be equal to or exceed the signal word letter height.

Laser Radiation Hazard Safety Symbol. “The laser radiation hazard safety symbol shall be composed of an equilateral triangle surrounding a sunburst pattern consisting of two sets of radial spokes of different lengths and one spoke, radiating from a common center.”

Message Panel Information. The message shall be in black letters on a white background or white letters on a black background. Adequate space shall be available within the message panel to allow for the inclusion of pertinent information. Such information may be included during the printing of the sign or may be handwritten in a legible manner, and shall include the following:

a) The hazard class of the laser controlled area.
b) Special precautionary instructions or protective action that may be applicable. For example:
   1) Laser Eye Protection Required
   2) Invisible Laser Radiation
   3) Knock Before Entering
   4) Do Not Enter When Light is Illuminated
   5) Restricted Area, Authorized Personnel Only
c) The highest hazard class of the laser or lasers within the laser controlled area. Additional information such as type of laser, pulse duration (as appropriate), and maximum output may be included.
d) The optical density of laser eye protection to be worn within the area.
e) The name and contact information for the LSO.

NOTE—The word “Radiation” on signs and labels may be replaced by the word “Light” for lasers operating in the visible range at wavelengths greater than 400 nm and equal to or less than 700 nm. For lasers operating outside of this visible range the word “Invisible” shall be placed prior to the words “Laser Radiation.”

---

1 American National Standard for Safe Use of Lasers ANSI Z136.1-2014; Section 4.6
Laser Controlled Area Warning Signs (continued):

Existing Laser Controlled Area Signs. Laser controlled area signs prepared in accordance with previous revisions of this standard are considered to fulfill the requirement of this standard.\(^1\)

However, it is strongly recommended that the most current version of the Laser Control Area Sign be used. Local governmental and/or regulatory agency may require that the most current standard be implemented. Laser safety applies both to patients and all health care personnel (HCP), meaning that the American National Standards (ANSI), the Center for Disease Control (CDC), the Food and Drug Administration (FDA), and the Occupational Safety and Health Administration (OSHA) regulations and guidelines must be followed by the practitioner.


Sample ANSI Z535.2-1998 / ANSI Z136.1-2014 Compliant Warning Sign for SIROLaser Advance Class 4 Laser Controlled Areas.\(^1\)

\(^1\) American National Standard for Safe Use of Lasers ANSI Z136.1-2014; Section 4.6
Laser Safety Guidelines & Requirements

Engineering Controls & Non Beam Hazards

Non-Beam Hazards:
- Respiratory Hazards (Laser Generated Airborne Contaminates (LGAC) / Laser Plume):
  - Laser Generated Airborne Contaminates (LGAC) often referred to as the laser plume are generated when laser energy interacts with matter. The quality, composition, and chemical complexity of the LGAC depends greatly upon the target material and beam irradiance.
  - The LGAC / laser plume is the biological hazard of gas fumes created when tissue is ablated (vaporized). It has been shown that laser plume can contain vital strains of the Human Papilloma Virus (HPV) and other organisms.
  - High Volume Evacuation (HVE) should always be used when a laser is in use to remove the laser generated airborne contaminates from the energy impact site to reduce the transmission of potentially hazardous particulates (the LGAC / laser plume).
  - The use of water irrigation may help reduce the laser plume.
  - The LGAC / laser plume created when performing Periodontal Pocket Debridement Laser Therapy is minimal due to the fact that the laser interaction is being performed in a fluid filled environment, however the highest volume evacuation possible should still be used.
  - A well-fitting surgical masks should also be worn.
- Fire Hazards:
  - Combustible materials must not be hit by the laser beam.
  - If oxygen is used in the area of laser treatment, extra caution should be taken, and if possible the use of oxygen avoided, if reasonably possible.
  - Nitrous oxide may be used with a laser but appropriate scavenger devices must be in place.
  - If general anesthesia is being performed, combustible gasses should not be used.
- Electrical Hazards:
  - Electric cords and cables must be kept in good repair.
  - Electric cords and cables should be kept out of the traffic pattern of personnel and patients.
  - All electrical connections need to be properly grounded.
- Human Factors:
  - All healthcare personnel must receive appropriate training for their roles in the laser utilization.
  - Safe and proper ergonomics systems should be utilized
  - Limit access and individuals in the Nominal Hazard Zone (NHZ) to patient and necessary personnel
  - User errors should be minimized if not eliminated completely.

Engineering Controls & Safety Mechanisms:
The FDA has established the Federal Laser Product Performance Standard (FLPPS) which requires that Class 4 lasers have the following engineering controls and safety mechanisms in place to help facilitate their safe utilization.
- Software Self Check (POST)
- Fiber Interlock Switch
- Automatic Sleep Mode
- Visual & Auditory Laser Emission Indicators
- Labeling on the device emitting laser light
- Password or Keyed Locking Mechanism
- Guarded activation Switch
  - Foot Control “Safety” Cover
  - Recessed Finger Switch
- Containment Case Interlock
- Emergency Shut Off Switch
Facility Policies on Laser Safety Procedures and Protocols

The purpose of this document is to define the practice's protocols for the safe and effective use of lasers and light base technologies in the performance of oral healthcare for this facility. As lasers present special dangers to individuals (patients and staff) who are present in the "controlled" area known as the Nominal Hazard Zone (NHZ), specific considerations and protocols must be followed. These precautions greatly reduce the primary risks of fire, electrical injury, biologic, and especially ophthalmic injury.

The use of all Health Care Laser Systems (HCLS) and laser products are to be used in accordance with the American National Standards Institute (ANSI) z136 standards. More specifically the HCLS will be used in accordance with the ANSI standards documents z136.1, The Safe Use of Lasers, and z136.3, The Safe Use of Laser in Healthcare. All lasers systems and products are to be used as specified by the manufacturer’s classification and instructions. All HCLS will have periodic safety audits of laser systems, related equipment, and accessories at least once every 3 months.

The facility has the following Class 3 and 4 laser systems:

<table>
<thead>
<tr>
<th>Laser System</th>
<th>Wavelength (WL)</th>
<th>Laser Class</th>
<th>NOHD</th>
<th>Eyewear’s OD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All Health Care Personnel (HCP) in the facility will be properly trained to the level as related to their role and potential exposure to laser radiation. Licensed dental professionals must use lasers within their scope of practice and in a manner where the procedure is safe, effective and consistent with the clinician’s education, training and experience. The training programs shall be specific to the HCLS (lasers) to be utilized, and to the procedures to be performed. Program criteria and content shall be in accordance with facility policies and procedures, applicable standards, and government regulations (local, state, and federal). All personnel that are laser users, laser operators, Laser Safety Officers (LSO), Deputy Laser Safety Officers (DLSO), and Laser Safety Site Contact (LSSC) will have appropriate retraining programs at intervals determined by the applicable regulations, but not less frequently than every five years.

Maintenance of Records Related to Laser Systems

The following records will be maintained for seven (7) years:
- Laser education and training records for all related personnel.
- Protective eyewear maintenance logs for the inspection, and removal from service.
- Inspection, calibration, service, and maintenance records.
- Laser related incidence/accident reports and related correspondence.

Laser Safety Officer (LSO)

The following individual, __________________________________________________________, has been designated as the Laser Safety Officer (LSO) has the authority and responsibility to monitor and enforce the control of laser hazards and to effect the knowledgeable evaluation and control of laser hazards.

The LSO shall ensure that appropriate laser safety education and training has been provided to all people associated with lasers such as providers, clinicians, staff, technicians, students, and other health care personnel (HCP). The LSO shall ensure maintenance of records of laser safety education and training of those HCP. The LSO may delegate appropriate procedures and responsibilities to other suitably trained HCPs to help ensure that all HCLS and the environments they are utilized are properly maintained and utilized in a safe and effective manner.
Facility Policies on Laser Safety Procedures and Protocols

(continued)

Laser Safety Officers (LSO) Responsibilities

- Verification of laser classification for Class 3b or Class 4 lasers or laser systems in the facility.
- Hazard evaluation of laser areas, including Nominal Hazard Zones (NHZ).
- Maintaining records of all Class 3b and Class 4 lasers.
- Ensuring that appropriate polices, protocols, and procedures have been established and are properly followed for the control of laser hazards.
- Ensuring that the Laser Protective Eyewear (LPE) is appropriate, in satisfactory condition, properly used, and is routinely inspected.
- Ensuring that all of the required labels and signs are appropriate in place and their routine inspection.
- Conduct periodic safety audits of laser systems, related equipment, and accessories.
- To conduct surveys and inspections of all areas where laser equipment is used. To periodically inspect the functionality of the laser systems, related equipment, accessories, and safety features and ensure corrective action is taken if required.
- Suspend, restrict, or terminate laser or laser system operation, if laser hazard controls are determined inadequate.
- Overseeing and ensuring that all HCP are appropriately trained on the laser's use and safety.
- Controlling and managing the passwords and or keys for activating the laser.
- Participate in accident investigations involving lasers and issuing laser incident/accident notifications and report any significant laser related injury to the laser manufacturer and appropriate agencies.
- Assuring the necessary records required by government regulations are maintained. (Documenting: maintenance programs, training records, audits, SOP, etc.)
- Overseeing and delegating duties to the Deputy Laser Safety Officer and Laser Safety Site Contact.

Laser Incident Reporting Protocol

The Laser Safety Officer (LSO) or an appropriately designated person:

A. Shall notify the manufacturer of the laser system and the applicable agency by telephone within 24 hours of any incident that has caused or may have caused:
   1. Permanent loss of sight in either eye, or
   2. Third-degree burns of the skin involving more than 5 percent of the body surface as estimated by the rule of nines.

B. Shall notify the manufacturer of the laser system and the applicable agency by telephone within five working days of any incident that has or may have caused:
   1. Any second-degree burn of the skin larger than one inch (2.54 centimeter) in greatest diameter, or
   2. Any third-degree burn of the skin, or an eye injury with any potential loss of sight.

C. Shall file a written report with the manufacturer of the laser system and the applicable agency of any known exposure of an individual to laser radiation or collateral radiation within 30 days of its discovery, describing:
   1. Each exposure of the individual to laser or collateral radiation that exceeds the applicable Maximum Permissible Exposure (MPE), and
   2. Any incident that triggered a notice requirement in sections (A) or (B) above.
   3. These written reports shall describe the extent of exposure to each individual including:
      1. An estimate of the individual’s exposure,
      2. The level of laser or collateral radiation involved,
      3. The cause of the exposure, and
      4. The corrective steps taken or planned to prevent a recurrence.
Laser Inspection and Maintenance Log

Laser Device: ___________________________________ Wavelength(s): _______nm  Laser Class: ___

Required Labels are on the Device and Legible: Yes / No
☐ Laser Radiation Symbol  ☐ Wavelengths and Maximum Power
☐ Caution Label (Laser Classification and Potential Dangers):

Nominal Ocular Hazard Distance (NOHD) for this Device: ____________

Nominal Hazard Zone(s) (NHZ) for the Use of this Device Have Been Identified: Yes / No

Required Laser Safety Signs are Appropriate and in Satisfactory Condition: Yes / No

Laser Protective Eyewear:
  Minimal Optical Density (OD) / Laser Filtration (L) Required: ____________
  Number of Pairs of Eyewear Inspected and in Satisfactory Condition for this Device: ______

Laser System Has Been Inspected and is in Satisfactory Condition: Yes / No
☐ Condition of Containment Case  ☐ Software Self Check (POST)
☐ Password / Key Mechanism  ☐ Automatic Sleep Mode
☐ Guarded Activation Switch  ☐ Visual & Auditory Laser Emission Indicators
☐ Safety Interlock Mechanism  ☐ Emergency Shut Off Switch

Evacuation System for the Laser Generated Airborne Contaminants (LGAC) / Laser Plume is Appropriate and Functioning Satisfactorily: Yes / No

Date of Last Calibration of the Laser Device: ________________________________

All Employees in the Area Where the Device is in Use Have Been Appropriately Trained on Laser Safety to their Level of Potential Exposure and Use: Yes / No
  (Training Must be Documented):

Are the Appropriate Forms Available to Record Any Incident that Might Occur for an Exposure in Excess to the Maximum Permissible Exposure (MPE) of Laser Energy: Yes / No

Has There Been Any Reportable Incidents of Anyone Being Exposed in Excess to the Maximum Permissible Exposure (MPE) of Laser Energy with this Device: Yes / No
  (If Yes, Include a Copy of the Report to This Document)

Regulatory Documents that Have Been Submitted since the Last Report was Completed:
________________________________________________________________________
________________________________________________________________________

Other Laser Safety Concerns or Information that Need to be Included in this Report:
________________________________________________________________________
________________________________________________________________________

Name of the Laser Safety Officer (LSO) for this Location: _________________________________________

Completed By (Print Name): ________________________________________ Title: ___________________

Signature: ________________________________ Date: ____________________

Copyright © 2013 Advanced Integration & Mentoring (LIMLG-1305-1)
Laser Calibration and Inspection Log

Laser Device: ____________________________  Wavelength(s): _____ nm  Laser Class: ___

Name of the Laser Safety Officer (LSO) for this Location: _______________________________________

<table>
<thead>
<tr>
<th>Date of Inspection</th>
<th>Inspection Performed By</th>
<th>Date of Calibration</th>
<th>Calibration Performed By</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Laser Incident / Accident Reporting Form

Office Name: _________________________________________ Phone #: ___________________________
Office Address: ______________________________________
Name of the Laser Safety Officer (LSO): _______________________________________________________
   Contact Person (if different from LSO): ____________________________________________________
Laser Device: _____________________________________ Wavelength(s): _______ nm Laser Class: ____
Name of Injured Person: ___________________________________________________________________
   Address: ____________________________________________________________________________
   Phone #s: Home: _____________________ Work: ___________________ Cell: ______________________
Date of Incident: ______________________________ Time: ___________________
Person Operating the Laser Device: ___________________________________________________
Nature of Injury:

☐  Permanent loss of sight in either eye
☐  Third-degree burns of the skin involving more than 5 percent of the body surface
☐  Third-degree burn of the skin involving less than 5 percent of the body surface
☐  Second degree burn of the skin larger than one inch (2.54 cm) in greatest diameter
☐  Eye injury with any potential loss of sight.
☐  Other ____________________________________________________________________________

Extent of Injury: _______________________________________________________________________
Cause of the Incident / Injury: ____________________________________________________________
Corrective steps taken or planned to prevent a recurrence: ____________________________________
Estimated Amount of Radiation and Individual's Exposure: _________________________________
Incident Reported by :  ☐ Telephone  ☐ In Writing  ☐ Other: _________________
   To Organization: __________________________________________________ Date: ___________ Time: _______
   Individual’s Name: ___________________________________ Position: ________________
Additional Report by:  ☐ Telephone  ☐ In Writing  ☐ Other: _________________
   To Organization: __________________________________________________ Date: ___________ Time: _______
   Individual’s Name: ___________________________________ Position: ________________

Attach Any Additional Documents, Statements, Correspondence, and Amendments, to this Form

Completed By (Print Name): ________________________________________ Title: _____________________
Signature: _____________________________________ Date: ___________________