THE UNIVERSITY OF TEXAS MEDICAL BRANCH

LASER SAFETY MANUAL

ENVIRONMENTAL HEALTH & SAFETY RADIATION SAFETY PROGRAM

Revised: May 2014
# UTMB LASER SAFETY MANUAL

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1. GENERAL INFORMATION

1.1 PURPOSE:

- To establish the policies and procedures for protection against non-ionizing radiation hazards produced by lasers and intense-pulsed light (IPL) devices at UTMB facilities.

- To implement a laser safety program that complies with Texas Administrative Code (25 TAC 289.301) applicable to the registration and radiation safety requirements for lasers and the conditions of the Certificate of Laser Registration issued by the Texas Department of State Health Services to UTMB.

1.2 SCOPE:

- This manual establishes requirements that are applicable to all persons who receive, possess, acquire, transfer, or use lasers and laser systems that operate at wavelengths between 180 nm and 1 mm, and IPL devices at UTMB facilities; or who operate UTMB owned lasers and IPL devices at temporary sites for limited time periods.

- The contents of this manual have been developed by the UTMB Laser Safety Subcommittee (LSSC) and approved by the UTMB Radiation Safety Committee (RSC).

- In situations where there is a conflict with the policies and procedures contained in this manual and those contained in local policies and procedures, such as “UTMB Nursing Practice Standards,” those contained in this manual shall take precedence.

1.3 PROHIBITIONS:

- Lasers and IPL devices shall not be used in any manner that creates a threat or danger to UTMB faculty, staff, patients, and/or the general public.

- Individuals shall not be intentionally exposed to laser and IPL radiation above the Maximum Permissible Exposure (MPE) unless such exposure is by a licensed practitioner of the healing arts who is also an Authorized Laser User at UTMB.

  - Exposure of an individual for training, demonstration or other non-healing arts purposes is prohibited unless under the direct supervision of a practitioner of healing arts who is also an Authorized Laser User at UTMB.

  - Exposure of an individual for the purpose of healing arts screening is prohibited without specific authorization from the LSSC.
Exposure of an individual for the purpose of research on humans is prohibited unless prior authorization is received from the institutional review board (IRB) and LSSC.

1.4 Roles and Responsibilities:

1.4.1 LASER SAFETY SUB-COMMITTEE

UTMB Radiation Safety Committee (RSC) is ultimately responsible for laser safety oversight for both clinical and research use of lasers and IPLs. Under the RSC, the Laser Safety Sub-Committee (LSSC) directly oversees the laser safety programs at UTMB campus and off-site campus. The Laser Safety Sub Committee (LSSC) consists of the Committee Chairman, the LSO, laser users, management representative - persons knowledgeable in laser safety and/or laser technology, and others as needed. The LSSCs’ responsibilities include but not limited to:

a) Establishing and maintaining internal policies/procedures to ensure they comply with applicable regulations and standards.
b) Resolving conflicts or issues identified by the LSO, laser users, or other parties.
c) Performing annual program reviews, and
d) Maintaining an awareness of all applicable new or revised laser safety standards.

1.4.2 LASER SAFETY OFFICER

The Laser Safety Officer’s responsibilities include but not limited to:

a) Administering the day-to-day operation of the Laser Safety Program.
b) Maintaining a current inventory of Class 3B and 4 lasers.
c) Functioning as liaison between the LSSC and ALUs
d) Accompanying outside inspectors/regulators on laser safety inspections.
e) Performing laser hazard analyses and audits; ensure, by follow-up and additional audits that all laser safety deficiencies are addressed and resolved.
f) Making recommendations to improve laser safety.
g) Restricting or terminating use of lasers that present an imminent danger or excessive hazard.
h) Ensuring the availability of proper laser safety training.
i) Making recommendations for selection of proper personnel protective equipment.
j) Investigating laser accidents and near misses.
k) Updating laser safety policy and procedures as needed.
l) Ensuring maintenance of laser user’s most recent laser safety training records.
m) Providing periodic reports on the status of laser safety to the LSSC and RSC.
1.5 **DEFINITIONS:**

- **Authorized laser user (ALU):** A faculty member who, by virtue of their training and experience, has been designated by the LSSC as being qualified to use Class 3B and Class 4 lasers at UTMB.


- **Class 2 (II) laser:** Any laser that permits access during its operation to levels of visible laser radiation (there are no Class 2 non-visible lasers) in excess of the accessible emission limits for Class 1 lasers, but does not permit access during its operation to levels of laser radiation in access of the accessible emission limits contained in ANSI Z136.1-2007.

- **Class 3a (IIIa) laser:** Any laser that permits access during its operation to levels of visible laser radiation in excess of the accessible emission limits for Class 2 lasers or levels of non-visible laser radiation in excess of the accessible emission limits for Class 1 lasers, but does not permit access during its operation to levels of laser radiation in access of the accessible emission limits contained in ANSI Z136.1-2007.

- **Class 3B (IIIb) laser:** Any laser that permits access during its operation to levels of laser radiation in excess of the accessible emission limits for Class 3a lasers, but does not permit access during its operation to levels of laser radiation in access of the accessible emission limits contained in ANSI Z136.1-2007.

- **Class 4 (IV) laser:** Any laser that permits access during its operation to levels of laser radiation in excess of the accessible emission limits for Class 3B lasers.

- **Direct Supervision:** The Authorized User (or Technical Staff where appropriate) responsible for supervision of the person being trained is present in the room where the laser is being used.

- **Intense Pulsed Light (IPL) device:** A device that emits radiation to energy density levels that could reasonably cause bodily harm and is used for photothermolysis.

- **Maximum permissible exposure (MPE):** The level of laser radiation to which a person may be exposed without hazardous effect or adverse biological changes in the eye or skin. MPE values may be found in ANSI Z136.1-2007.
• **Medical event:** Any adverse patient health effect that is a result of failure or misuse of laser safety equipment.

• **Nominal Hazard Zone (NHZ):** The space within which the level of direct, reflected, or scattered radiation during operation exceeds the applicable MPE.

• **Permit administrator:** The faculty member who acts as the point of contact for all correspondence regarding activities under a laser use permit issued by the UTMB LSSC.

• **Practitioner of the healing arts (practitioner):** A person licensed to practice the healing arts by either the Texas State Board of Medical Examiners as a physician; the Texas State Board of Dental Examiners; the Texas Board of Chiropractic Examiners; or the Texas State Board of Podiatry Examiners. A practitioner’s use of a laser is limited to his/her scope of professional practice as determined by the appropriate licensing agency.

• **Technical staff:** Non-faculty who have met certain training and experience requirements as set forth in this manual and whose laser use is under the general supervision of an ALU.

### 1.6 EXEMPTIONS:

• Class 1 (I), Class 2 (II), Class 3a (IIIa) lasers and IPL devices are exempt from the permitting portions of this manual.

• Inoperable and lasers in transit or in storage incident to transit are exempt from this manual.

### 1.7 PERMITTING & REGISTRATION OF CLASS 3B AND 4 LASERS:

• All Class 3B and Class 4 lasers used at UTMB facilities will be registered under a laser Use Permit with the UTMB LSSC prior to use.

• Permitting will be accomplished by completion and submission (to the UTMB Radiation Safety Office) of the UTMB Application for Laser Use Permit.

• Submission of the Application for Laser Use Permit is the responsibility of the faculty member that purchased, borrowed, arranged for demonstration, or otherwise obtained the laser, or that is primarily responsible for the use of the laser within their department.

• A temporary permit will be issued for a specified time period for lasers that are brought on campus for short term use (e.g. borrowed lasers and lasers brought on campus for demonstration purposes).

  ▪ These temporary registrations will be issued for specific pieces of equipment and are not transferable.
• Temporary registrations may be renewed if necessary within 30 days prior to the expiration date.

• For the use of a laser intended for demonstration by a non-UTMB employee, a copy of the Certificate of Laser Registration issued to the individual or company providing the laser by the Texas Department of State Health Services (DSHS) in accordance with the requirements of the Texas Administrative Code (25 TAC 289.301) shall be provided to the Radiation Safety Office.

• Failure to register a Class 3B or Class 4 laser does not relieve UTMB faculty, staff, and students from compliance with the requirements of this manual.

• The Laser Use Permit may be terminated at the discretion of the LSSC.

1.8 PERMIT TO USE LASERS:

• Faculty members who wish to use Class 3B or Class 4 lasers at UTMB shall submit a Laser Use Permit Application to the LSSC.

• A Laser Use Permit may be issued to a single faculty member or to a group of faculty members (see specifics in the sections on Human Use of Lasers and Non-human Use of Lasers).

• Permit Administrators shall immediately inform the Radiation Safety Office of any changes to the list of Authorized Laser Users who are permitted to use lasers approved under the Laser Use Permit.

• Those individuals who, by virtue of their training and experience, have been designated by the LSSC as being qualified to use Class 3B and Class 4 lasers at UTMB shall be designated as an Authorized Laser User (ALU).

• Only Authorized Laser Users or individuals supervised by an Authorized Laser User may use Class 3B and Class 4 laser producing devices at UTMB facilities.

• Non-faculty who have met certain training and experience requirements as set forth in this manual shall be designated Technical Staff for Laser Use and may use lasers under the general supervision of an ALU.

• Permits will be issued for a period not to exceed four (4) years.

1.9 RESPONSIBILITIES OF PERMIT ADMINISTRATOR:
• Notify the UTMB Laser Safety Officer (LSO) of any transfer or disposal of a registered laser.

• Notify the LSO of the movement of any fixed laser to a location not listed on the registration for that laser.

• Ensure that registered lasers are properly maintained, aligned, calibrated and repaired by qualified persons.
  
  o Permit Administrators shall not allow non-UTMB employees to provide such services without first obtaining a copy of documents indicating that the vendor/person is registered with the Texas DSHS to provide laser services. A copy of these documents shall be sent to the Radiation Safety Program.

• Conduct an inventory of all lasers in their possession semiannually or annually, depending on the audit cycle for the specific registration, and provide a copy to the LSO. The RSO will provide Permit Administrators with a form to use for this purpose.

• Ensure that only appropriately trained and authorized individuals use the lasers on their Laser Use Permit.

• Maintain a current list of individuals authorized to use the lasers on their Laser Use Permit.

• Notify the LSO immediately upon discovery that a registered laser is stolen, lost or missing.

• Notify the LSO of any changes in permit information (e.g. change of Permit Administrator, Permit Administrator address, etc.)

• For terminating a Permit for Laser Use and/or the disposal of a lasers, the responsibilities of the Permit Administrator includes notifying the LSO when a laser is moved, disposed of or placed in inactive status. If it is disposed of, an amendment to the Laser Use Permit will be developed and the disposal will be reported to the LSSC.

• Comply with any and all terms and conditions listed on the Laser Registration Certificate.

1.10. TRAINING/QUALIFICATIONS:

• All individuals who work with or in the vicinity of lasers and IPL devices shall be knowledgeable about the devices in their work area and the potential health hazards associated with the use of these devices.

• Faculty training requirements are listed in the sections for Human-use Permits and Non-human-use Permits.

  o Technical staff shall have a training that includes but not limited to:
- Fundamentals of lasers, types and characteristics
- Effects of laser EM radiation on tissue (eyes and skin)
- Laser applications
- Laser safety

- A hands-on training with the class and wavelengths of lasers to be used must be completed prior to use.

- Retraining programs shall be completed in accordance with facility policy, procedures and applicable regulations, but not less frequently than every three (3) years.

- Documentation of training shall be in a manner approved by the LSSC.

- Exemptions from attending UTMB laser training classes
  - Individuals who have documentation of comparable training received prior to arriving at UTMB and approved by LSSC.
  - Individuals who have documentation of comparable training received outside of UTMB and approved by LSSC.
  - Individuals who have completed training elsewhere but lack documentation acceptable to the LSSC who pass a written exam administered by the UTMB Radiation Safety Office.
  - Faculty members whose training and experience history has been accepted by the LSSC in the course of becoming an ALU.
  - Individuals who have been granted exemption by the LSSC.

- Documentation of hands-on training shall be signed by the preceptor.
- Retraining programs shall be completed in accordance with facility policy, procedures and applicable regulations, but not less frequently than every three (3) years.

**1.11. REQUIREMENTS FOR PROTECTION AGAINST CLASS 3B OR 4 LASERS AND IPL DEVICE RADIATION:**

- **Installation, Service, Repair, Maintenance and Calibration**
  - These activities shall only be performed by a qualified individual.
  - These activities shall be performed in accordance with the manufacturer’s documents (e.g. owners/operators manual, service manual, etc.)
These devices and their lasing media shall not be altered to cause the device to operate outside the manufacturers intended operating parameters without prior authorization from the RSO.

- **Instructions to Personnel**

  - Written instructions for proper and safe use of these devices shall be provided to all personnel who operate them.

- **Engineering Controls**

  - **Protective Housing**
    - Each Class 3B or 4 lasers shall have a protective housing that prevents access during operation to laser and collateral radiation that exceeds the limits of Class 1 lasers.
      - If access to levels of laser radiation that exceed the Class 1 limits is necessary for the intended use of the laser, then the accessible levels shall not exceed the limits of the lowest laser class necessary to perform the intended use of the laser.
    - These lasers shall not be operated with the protective housing removed unless authorized by the RSO. In such cases, additional control measures may need to be implemented.

  - **Safety Interlocks**
    - A safety interlock shall be provided for any portion of the protective housing that can be removed or displaced during normal operations or maintenance allowing access to radiation above the MPE limits. This interlock shall ensure that radiation is not accessible above MPE limits.
    - Any adjustment or modification of a laser containing interlocks shall not cause the interlocks to become inoperative or the radiation to exceed the MPE limits except where a controlled area has been established that has the approval of the RSO.

  - **Viewing Optics and Windows**
    - All viewing ports, viewing optics, or display screens in a laser or laser product shall have an interlock, filters, or attenuators that will keep the laser radiation at the viewing position at or below the MPE during the use of the laser.
    - All collecting optics, such as lenses, telescopes, microscopes, endoscopes, etc., used for viewing with a laser, shall have an interlock, filters, or attenuators to maintain the laser radiation transmitted through the collecting optics to levels at or
below the appropriate MPE. Normal or prescription eyewear is not considered collecting optics.

- Warning Systems
  - Each Class 3B or Class 4 laser or laser product shall provide visual or audible indication during emission of accessible laser radiation.
    - For Class (3B except those that allow access only to less than 5 mW peak visible laser radiation) and Class 4 lasers, this indication shall be given sufficiently prior to emission of radiation to allow appropriate action to avoid exposure.
  - Visual indicators shall be clearly visible through the protective eyewear appropriate for the laser(s) involved.
  - If the laser and laser energy source are housed separately and can be operated at a separation distance of greater than 2 meters, both the laser and laser energy source shall have visual or audible indicators.
  - The visual indicators shall be positioned so that viewing does not require human access to laser radiation in excess of the MPE.

- Controlled Areas
  - A controlled area shall be established for a Class 3B (except those that allow access only to less than 5 mW visible peak power) or Class 4 laser when exposure to laser radiation in excess of the MPE is possible.
  - Access to the controlled area shall be restricted to authorized personnel only.
  - The area shall be posted with appropriate signs, notices and labels approved by the RSO.
    - For Class 4 indoor controlled areas, latches, interlocks or other appropriate control measures shall be established in accordance with the requirements of 25 TAC 289.301 to prevent unauthorized entry.

- Key Control
  - Each Class 3B or Class 4 laser and IPL device shall incorporate a key activated or computer actuated master control.
  - The key shall be removable and the Class 3B or Class 4 or IPL device shall not be operable when the key is removed.
When devices are not being prepared for operation or is unattended, the key shall be removed from the device and stored in a location away from the device.

- **Personnel Protective Equipment (PPE)**
  
  o Eye protection shall:
    
    - Be worn by all individuals with access to Class 3B and/or Class 4 levels of laser radiation.
    
    - Provide a comfortable and appropriate fit all around the area of the eye.
    
    - Be in proper condition to ensure the optical filter and holder provide optical density or greater at the desired wavelengths, and retain all protective properties during use.
    
    - Be suitable for the specific wavelength of the laser and be of optical density adequate for the energy involved.
    
    - Be labeled with the optical density or densities and associated wavelength permanently on the filters or eyewear.
    
    - Be examined at intervals not to exceed 12 months to ensure reliability of protective filters and integrity of protective filter frames.
      
      - Documentation of this inspection shall be made and maintained.
      
      - Unreliable eyewear, such as scratched or damaged eyewear shall be discarded immediately.

  NOTE: It would be in the wearer’s best interests to inspect the protective eyewear prior to each use to ensure reliability and unreliable units discarded at this time rather than wait for the annual inspection.
  
  o Skin Protection
    
    - Protective gloves, clothing, or shield shall be required when there is a possibility of exceeding the MPE limits for skin.

1.12. **NOMINAL HAZARD ZONE (NHZ):**

- Where applicable, in the presence of unenclosed Class 3B and 4 laser beam paths, a NHZ shall be established.
1.13. CAUTION SIGNS, LABELS AND POSTING FOR LASERS AND IPL DEVICES:

- All lasers and laser systems, except Class 1, shall have appropriate warning labels with the sunburst logotype symbol and the appropriate cautionary statement in accordance with 25 TAC 289.301.

- Labels shall be affixed to a conspicuous place on the laser housing or control panel. Labels should be placed on both the housing and the control panel if these are separated by more than two (2) meters.

- Controlled area signs shall be posted, and contain appropriate logo and wording in accordance with 25 TAC 289.301.

1.14. AUDITS:

- Laser Registrations and Laser Use Permits shall be audited for compliance with 25 TAC 289.301 and the UTMB Laser Safety Manual at intervals not to exceed 6 months.
  - The audit interval may be extended to an interval not to exceed 12 months for specific Registrations and Permits at the discretion of the UTMB Laser Safety Officer (LSO) based on their compliance history.
  - The audit interval shall revert to an interval not to exceed 6 months for Registrations and Permits that fail to maintain a satisfactory compliance history.

1.15. NON-BEAM HAZARDS:

- **Electrical**
  - The risk of electrical shock and/or electrocution exists when the protective housing is removed.
  - Electrical wiring should have guards and be properly grounded.
  - Only authorized individuals should attempt to provide maintenance and/or service to lasers.

- **Biological**
  - Airborne biological hazards may exist when personnel are exposed to contaminants generated from laser interaction with human tissue or other materials.
  - Additional ventilation may be needed in the area of laser use.
Personnel in the area may need to wear appropriate respiratory PPE.

- **Chemical**
  - The lazing media in some lasers present a potential toxic and/or carcinogenic hazard to personnel performing service and maintenance on the laser.
  - Only authorized individuals should attempt to provide maintenance and/or service to lasers.
  - Maintenance/service personnel should consult the MSDS prior to handling the lazing media.

- **Fire**
  - Due to their high power output, Class 3B and 4 lasers present a potential fire hazard.
  - Extreme caution shall be exercised when lasers are used in the presence of combustible and/or flammable materials.
    - To the extent possible, flammable and combustible materials shall be minimized in areas where lasers are used.
    - Suitable fire extinguishing agents shall be kept readily available in areas where lasers are used.
    - Where appropriate, beam blocks shall be used to dissipate heat.
    - Order only the quantity of flammable chemicals needed by the area and store these materials in flammable cabinets as required by NFPA 30. For more information, contact the LSO.

1.16. **EMERGENCY PROCEDURES:**

- **Written emergency procedures**
  - Written emergency procedures, applicable to the specific Class 3B and 4 lasers in use, shall be posted in the areas where Class 3B and 4 lasers are used.
  - All laser users shall familiarize themselves with these emergency procedures.

- **Medical attention**
Authorized Users and/or Technical Staff shall immediately seek appropriate medical attention for any individual injured by exposure to non-ionizing radiation from a Class 3B or Class 4 laser, or from an IPL device.

**Notification of injury or death**

- Any UTMB faculty, staff or student who becomes aware of an incident resulting in the injury or death of an individual caused by a Class 3B or 4 lasers or an IPL device shall immediately notify the Radiation Safety Office.
2: HUMAN-USE OF LASERS

2.1. TRAINING:

- Practitioners who apply to become an ALU for human-use shall have a training that includes but not limited to
  - Fundamentals of lasers, types and characteristics
  - Effects of laser EM radiation on tissue (eyes and skins)
  - Clinical applications of lasers
  - Laser safety

  - A hands-on practical training with the types of lasers and at the wavelengths that will be used in clinical application shall be provided by the practitioner.

  - Retraining programs shall be completed in accordance with facility policy, procedures and applicable regulations, but not less frequently than every three (3) years.

- Practitioners must also meet training requirements established by applicable licensing boards and agencies of Texas.

- Documentation of training shall be in a manner approved by the LSSC.

2.2. PERMIT FOR HUMAN-USE OF LASERS:

- All intentional exposure of humans to laser radiation from a Class 3B or Class 4 laser must be by a practitioner of the healing arts who is also designated as an Authorized Laser User by the UTMB LSSC, or by persons under their direct supervision.

- Research protocol involving the intentional exposure of humans to laser or IPL device radiation must be reviewed and approved by both the UTMB IRB and the UTMB LSSC.

- Faculty members who wish to use Class 3B or Class 4 lasers on humans at UTMB shall submit a Laser Use Permit Application to the LSSC.

  - A Laser Use Permit Application may be submitted by a single faculty member or by a group of faculty members in the same department.

  - Where more than one faculty member is listed on the application, the Department Chair will designate one of the faculty members to serve as Permit Administrator.

  - For each applicant, the application shall list the types of lasers and the medical procedures for which authorization is being requested.
If the laser(s) for which authorization is being requested does not belong to the faculty member’s department, the application must also be signed by the Permit Administrator for the laser(s) as designated on the Laser Use Permit.

- Only those faculty members who are licensed practitioners and who meet the training and experience requirements for human-use will be designated by the LSSC as being qualified to use Class 3B and Class 4 lasers on humans at UTMB.

2.3. REQUIREMENTS FOR PROTECTION AGAINST CLASS 3B OR 4 LASERS AND IPL DEVICE RADIATION:

- Personnel Protective Equipment (PPE)
  
  - Eye protection shall:
    
    - Be provided for patients when their eyes are potentially within the NHZ.
      
    - Patient eye shielding may take the form of glasses, goggles, eye pads, corneal shields adequate to protect against the wavelength and intensity of the laser in use. **Gauze pads are not sufficient for laser eye protection.**
      
    - Patient eye shielding is in no way intended to restrict or limit the use of laser radiation intentionally administered for therapeutic or diagnostic purposes.

2.4. NON-BEAM HAZARDS:

- **Fire**
  
  - Extreme caution shall be exercised when lasers are used in medical procedures in the presence of combustible and/or flammable materials.
    
    - To the extent possible, flammable and combustible materials shall be minimized in areas where lasers are used in medical procedures.
    
    - Suitable fire extinguishing agents shall be kept readily available in areas where lasers are used in medical procedures.

2.5. EMERGENCY PROCEDURES:

- **Notification of injury or death**
o Any UTMB faculty, staff or student who becomes aware of a medical event caused by a Class 3B or Class 4 laser or an IPL device shall immediately notify the Radiation Safety Office and Clinical Risk Management.

3: NON HUMAN-USE LASERS

3.1. TRAINING/QUALIFICATIONS:

o Faculty who apply to become an ALU for non human-use shall have a training that includes but not limited to

- Fundamentals of lasers, types and characteristics
- Effects of laser EM radiation on tissue (eyes and skin)
- Applications of lasers
- Laser safety

o A hands-on practical training shall be provided by the faculty member with the types of lasers and at the wavelengths that will be used in the laboratory.

- Documentation of training shall be in a manner approved by the LSSC.

- Retraining programs shall be completed in accordance with facility policy, procedures and applicable regulations, but not less frequently than every three (3) years.

3.2. PERMIT PROCESS for non-human use of lasers:

- Faculty members who wish to use Class 3B or Class 4 lasers for non-human use at UTMB shall submit a Laser Use Permit Application to the LSSC.

  o A Laser Use Permit Application may be submitted by a single faculty member or by a group of faculty members.

  o Where more than one faculty member is listed on the application, one of the faculty members will be designated as Permit Administrator.

  o For each applicant, the application shall list the types of lasers for which authorization is being requested.

  o If the laser(s) for which authorization is being requested does not belong to the faculty member’s department, the application must also be signed by the person responsible for the laser(s) as designated on the Laser Registration Form.

- Only those faculty members who meet the training and experience requirements will be designated by the LSSC as being qualified to use Class 3B and Class 4 lasers at UTMB.
3.3. REFERENCES


(2) ANSI Z136.3 – American National Standards Institute Z136.3-2011 Safe Use of Lasers in Health Care Facilities

(3) ANSI Z136.8 – American National Standards Institute Z136.8-2012 Standard for the Safe Use of Lasers in Research, Development, or Testing

(4) 25 Texas Administrative Code §289.301
4: APPENDIX

**APPENDIX A: LASER SAFETY INSPECTION CHECKLIST**

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<tr>
<th>Permit Holder:</th>
<th>Permit No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building/Rm#:</td>
<td>Department:</td>
</tr>
<tr>
<td>Contact Person:</td>
<td>Phone #</td>
</tr>
</tbody>
</table>

Completed by:  
Date:  

1. **Equipment List:**

<table>
<thead>
<tr>
<th>S/L #</th>
<th>Make and Model</th>
<th>Laser Type</th>
<th>Laser Class</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

2. **Laser Posting, Labeling and Room Control Measures:**

<table>
<thead>
<tr>
<th>Upon Inspection:</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrances properly labeled and posted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room security</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entryway interlocks system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entryway interlocks system functioning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A door, blocking barrier, curtain, etc. at entryway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protective Windows</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser status indicator outside room</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment Labels</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. **Engineering Safety Control Measures:**

<table>
<thead>
<tr>
<th>Upon Inspection:</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective housing in place</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interlock on housing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam shutter present</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Key control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser activation-warning system (with emission delay) in place</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>Remote interlock connector (emergency shutoff) available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser secured to table</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser optics secured to prevent stray beams</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosed beam path</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited open beam path</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totally open beam path</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam barriers in place</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam stops in place</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam intensity reduced through filtration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective materials kept out of beam path</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remote monitoring/viewing devices</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. **Administrative and Procedural Safety Control Measures:**

| Standard operating procedures are available                         |     |    |     |
| Alignment procedures are available                                  |     |    |     |
| Laser operated, maintained and serviced by authorized personnel     |     |    |     |
| Permit holders/ workers’ laser safety training (General & Specific) |     |    |     |
| Has homebuilt/modified laser/laser system been classified           |     |    |     |
| Proper laser eye protection available                               |     |    |     |

COMMENTS:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
APPENDIX B: LASER SIGNS

Sample area warning sign for Class 3B and Class 4 Lasers
Sample warning sign for Class 3B and Class 4 Lasers
Sample area warning sign for a Temporary Laser Controlled Area