

Laser Safety Manual

Louisiana State University

*Original by Baton Rouge LSU Campus**Edited by James J. Davis III, Laser Safety Officer, LSU Health New Orleans*

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Section 1

LASER SAFETY PERSONNEL

1 Laser Safety Personnel

- James J. Davis III, Laser Safety Officer
Telephone: 504-314-5989; email jdavis3@lsuhsc.edu

Section 2

INTRODUCTION

The term LASER is an acronym for **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation. When energized, a laser emits an extremely collimated beam of intense monochromatic electromagnetic radiation ranging from the ultraviolet region through the visible region to the infrared region of the spectrum. The type of laser, the wavelength of the beam, and the use of the laser determine potential hazards as well as the intensity of the emitted radiation.

The following quote taken from the Laser Safety Institute of America's Laser Safety Manual states quite eloquently what the goal of a laser safety program should be and how that goal can be achieved:

"The success of a laser safety program depends on many people and organizations working together to achieve a common goal. This goal is simple: To use lasers safely and to comply with regulations and accepted industry standards. In order to achieve and maintain this goal, responsibilities are shared among all involved."

The goal of the LSU Laser Safety Program is to use lasers safely, while complying with any applicable regulations and/or industry standards.

Section 3

POLICY, STANDARDS, AND REGULATIONS

3.1 Policy

The policy is to limit exposure to personnel from Class 3B and Class 4 laser radiation to levels as low as reasonably achievable; however, under no circumstances is exposure to exceed appropriate State or Federal regulatory limits.

To implement this policy, the Radiation Safety Office has set up a laser safety program to ensure:

- The use of equipment, which produces laser radiation within LSU System for official business, is used in a manner that will minimize risks to health and safety of the faculty, staff, students, and the public.
- The identification of laser hazards.
- The prompt investigation of all reported laser radiation over-exposures and the establishment of immediate corrective action to prevent their recurrence.
- The maintenance of an accurate inventory for accountability of the hazardous lasers within the LSU System.

3.2 Standards

The American National Standards Institute (ANSI) currently has two standards applicable to Louisiana State University's Laser Safety Program. The first is ANSI Z136.1-2007, titled "American National Standard for Safe Use of Lasers". Its predecessor and the one that it replaced, is ANSI Z136.1 2000. The second is ANSI Z136.5-2009, titled "American National Standard for Safe Use of Lasers in Educational Institutions".

ANSI Z136.1-2007 is widely recognized as the industry standard since it is considered the most comprehensive publication for laser safety.

The Center for Devices and Radiological Health (CDRH) is a branch of the Food and Drug Administration (FDA). The CDRH enforces the Federal Laser Product Performance Standard, which directs manufacturers of lasers to ensure that lasers introduced into commerce meet safety and performance requirements

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POLICY, STANDARDS, AND REGULATIONS

such as laser energy output, interlocks, classification, and warning labels. The CDRH requires registration of laser products manufactured and sold in the US or imported into the US.

3.3 Regulations

The state of Louisiana has no regulations regarding laser safety at this time. However, the Occupational Safety and Health Administration (OSHA) addresses laser hazards in specific standards for the general industry.

Section 4

PROGRAM ADMINISTRATION

The authorization, structure, personnel, and responsibilities of individuals for the Laser Safety Program for Louisiana State University Health – New Orleans are described in this Section. The names and telephone numbers of individuals currently engaged in the Laser Safety Program are listed in Section 1.

4.1 Authorization

Administrative authorization is contained in [Permanent Memorandum-30](#) (issued by the Office of the President as well as in [Safety Procedures for Non-Ionizing Radiation](#) by the LSU System Radiation Safety Committee.

4.2 Laser Safety Officer (LSO)

The LSO is the individual designated by the LSU Radiation Safety Committee who has the authority and responsibility to establish, monitor, and enforce the laser safety program at LSUHSC in New Orleans.

The LSO reports to the Chairman of the Campus Radiation Safety Committee and has the following duties and responsibilities (per Appendix A, ANSI Z136.1-2007):

- Review and approve applications for Class 3B and Class 4 lasers and laser systems. Approval of Class 3B or Class 4 lasers/laser systems shall be given only if the LSO is satisfied that laser hazard control measures are adequate.
- Approve standard operating procedures (SOPs).
- Verify classifications of lasers under the LSO's jurisdiction.
- Maintain an accurate inventory of regulated lasers.
- Responsible for hazard evaluation of laser working areas and approve Laser Controlled Areas.
- Establish Nominal Hazard Zone (NHZ).
- Assure that the prescribed hazard control measures are implemented and maintained in effect.
- Approve Class 3B and Class 4 lasers Standard Operating Procedures (SOPs) as well as other procedures that may be part of the requirements for administrative and procedural controls.

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PROGRAM ADMINISTRATION

- Recommend or approve protective equipment, i.e. eyewear, barriers, screens, or anything that may be required to assure personnel safety. The LSO shall assure that protective equipment is audited periodically to assure proper working conditions.
- Review the wording on area signs and equipment labels.
- Review Class 3B and Class 4 laser installations, laser equipment, and protective equipment prior to use, including modifications to existing facilities.
- Assure that adequate laser safety training is provided to laser area personnel.
- Maintain necessary records.
- Periodically audit or survey by inspection for the presence and functionality of the laser safety features and control measures required for each Class 3B, Class 4 laser, or laser system in the laser facilities.
- Accompany regulatory agency inspectors reviewing the program or investigating an incident and document as needed.
- Investigate and document laser incidents and accidents.
- Assure corrective action is taken where required and enforce compliance with the authority to suspend, restrict, or terminate the operation of a laser or laser system.

4.3 Radiation Safety Office

The Radiation Safety Office will administer the Laser Safety Program, under the authorization of the Radiation Safety Committee. The Radiation Safety Committee is charged with the responsibility and authority to control the use of lasers and laser systems on campus. In order to track laser inventory, personnel training, and Laser Controlled Areas, the Laser Safety Program uses an Approval System. The process begins with Laser Registration.

4.4 Laser Approval / Registration

All of Class 3B and Class 4 lasers or laser systems, whether constructed, purchased, or otherwise obtained, from outside or inside the University, must be registered with the LSO.

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PROGRAM ADMINISTRATION

Individuals who wish to use lasers or laser systems in research, development, teaching, or demonstration projects must obtain prior approval from the LSO by completing and submitting a [Laser User Application](#) with an attached project outline to the LSO for review as well as Standard Operating Procedures to be taken.

The application and project outline include training and experience of the applicant, proper and sufficient equipment and facilities, adequate plans and standard operating procedures for the use of lasers, and a complete description/classification of the laser or laser system and its use.

The LSO's review may include discussions and site visits with specific suggestions for revision of the application.

Any changes (approval amendments) in the use of the laser, laser locations, significant modification of the laser system, and/or transfer of a laser require LSO notification. If you have any questions regarding changes to your original laser or laser use application, please contact the LSO at (504) 568-4952 or by email at jdavis3@lsuhsc.edu

4.5 Approval Amendments

Approval amendments must be filed with the LSO for the addition of new lasers, relocation of lasers, or other changes, which significantly deviate from the original laser application submitted by the Approved Laser User. Please notify the LSO of all changes by calling (504) 568-4952 or emailing jdavis3@lsuhsc.edu

4.6 LSU Fabricated Lasers

All lasers that are fabricated or significantly modified must adhere to all applicable FDA and CRDH rules. These rules are typically much stricter than the laser safety requirements on campus. The Approved Laser User is responsible to assure that the LSO is notified prior to these lasers leaving the campus.

4.7 Removal from registration

Any laser that is rendered permanently inoperable or is transferred may be removed from the Approved Laser User's inventory and from registration upon notification and documentation to the LSO. Please notify the LSO of all changes.

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PROGRAM ADMINISTRATION

4.8 Others with specific responsibilities

4.8.1 The Approved Laser User is the Laser Supervisor and shall have the following responsibilities:

- Shall be responsible for the issuance of appropriate instructions and training materials on laser hazards and their control to all personnel who may work with lasers that are operated within the supervisor's jurisdiction.
- Shall not permit the operation of a laser unless there is adequate control of laser hazards to employees, visitors, and the public.
- Shall submit the names of individuals scheduled to work with lasers to the LSO and shall submit information as requested by the LSO for training completion and medical surveillance.
- When an Approved Laser User knows of, or suspects, an incident/accident resulting from a laser operated under his/her authority, he/she shall immediately notify the LSO and take corrective actions.
- If necessary, the Approved Laser User shall assist in obtaining appropriate medical attention for any employee involved in a laser incident/accident.
- Shall not permit operation of a Class 3B or Class 4 laser under his/her authority without prior approval by the LSO.
- Shall submit plans for Class 3B and Class 4 lasers installations or modifications of installations to the LSO for review.
- Shall be familiar with the standard operating procedures and ensure that they are provided to users of such lasers.
- The Approved Laser User is responsible for all safety precautions pertaining to the registered laser system.

4.8.2 Laser Operator Responsibilities

- Shall not energize or work with or near a laser unless authorized to do so by the supervisor for that laser (the Approved Laser User).
- Shall comply with safety rules and procedures prescribed by the Laser Supervisor and the LSO and be familiar with all applicable operating procedures.

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PROGRAM ADMINISTRATION

- Shall immediately inform the Laser Supervisor if he knows or suspects that an incident/accident has occurred involving a laser and that such Incident/accident has caused, or could potentially have caused an injury. If the Laser Supervisor is unavailable, the Laser Operator shall notify the LSO promptly.

4.8.3 Department Chair Responsibilities for Abandoned Lasers

If an Approved Laser User leaves the University and his/her lasers and Laser Operators are not transferred to another Approved Laser User in a timely manner, the lasers and the Laser Operators will be transferred to the Department Chair until there is another Approved Laser User assuming the responsibilities.

4.8.4 Other Personnel Responsibilities

Anyone involved in purchasing a Class 3B or Class 4 laser or laser system shall contact the LSO.

Section 5

LASER SAFETY TRAINING

The LSO shall maintain a list of all persons who have been trained or certified in laser safety commensurate with their laser uses. Certification of training shall be by one of the following methods:

- a. Faculty by credentials submitted with the Laser User Application, or
- b. Certification submitted in writing, from the Approved Laser User that the person is trained in laser safety (LT1 form) and that he/she has taken the On-line Laser Safety Training Course successfully and understands the responsibilities as defined in this Laser Safety Manual.

Each Approved Laser User is required to provide in-laboratory training to all persons assigned to or who frequent their laboratories. The following topics shall be covered:

- The Laser Safety Manual.
- Description of the laser system.
- Review of SOPs for alignment, operation, and emergency.
- Identification of engineering controls.
- Identification of administrative controls.
- Review of intra beam hazards.

Such training shall be documented ([using LT1 Form](#)) in a timely manner and filed in the laboratory for future inspections as well as a copy to be sent or faxed to the Laser Safety Officer at 504-568-5185.

Section 6

AUDITS / SITE MONITORING / ENFORCEMENT

The LSO, under the authority of the Radiation Safety Office, has the responsibility for monitoring all locations where lasers or laser systems are used or stored. The audits (site monitoring) are made at least semiannually; no prior notification for such audits is given. The audits may be scheduled or unannounced.

The audits include:

- Laser and eyewear inventory verification.
- Inspection of eyewear for damage.
- Inspection of laser system for required engineering and administrative controls.
- Training record review.
- Review of SOP's.

Corrective recommendations will be sent in writing to the Approved Laser User regarding any deficiencies identified during audits. Because unsafe use of lasers may lead to serious injuries, any deficiencies, or unsafe conditions identified by the LSO and communicated to the Approved Laser User shall be corrected in a timely manner. If the deficiency is not corrected in a timely manner, enforcement actions may be necessary. These enforcement actions may include probation or suspension of the laser approval as well as securing lasers from further use.

LASER CLASSIFICATION

7.1 Laser Classification

Lasers are classified based on their potential hazard. The greater the hazard, the higher the classification number, and the more controls are required in order to provide a safe environment for laser uses. The classification definitions are based on ANSI Z136.1-2007 Safe Use of Lasers.

Class 1	Considered to be incapable of producing damaging laser exposure during operation and is, therefore exempt from any control measures or other forms of surveillance.
Class 1M	Considered to be incapable of producing damaging laser exposure during operation unless the beam is viewed with an optical instrument such as an eye-loupe (diverging beam) or telescope (collimated beam) and is, therefore exempt from any control measures other than to prevent potentially hazardous optically aided viewing, and is exempt from other forms of control measures.
Class 2	Emits in the visible portion of the electromagnetic spectrum (0.4 to 0.7 μm) and eye protection is normally afforded by the aversion response.
Class 2M	Emits in the visible portion of the electromagnetic spectrum (0.4 to 0.7 μm) and eye protection is normally afforded by the aversion response for unaided viewing, but is potentially hazardous if viewed with certain optical aids.
Class 3R	May be hazardous under direct and specular reflection viewing conditions, but is not normally diffuse reflections or fire hazard. Potentially hazardous under some direct and specular reflection viewing condition if the eye is appropriately focused and stable, but the probability of an actual injury is small; will not pose either a fire or diffuse-reflection hazard.
Class 3B	May be hazardous under direct and specular reflection viewing conditions, but is not normally diffuse reflections or fire hazard.
Class 4	Is a hazard to the eye or the skin from the direct beam; may pose a diffuse reflection or fire hazard; May also produce laser generated air contaminants (LGAC) and hazardous plasma radiation

Section 7

7.2 Embedded Lasers

Embedded lasers are those lasers that are embedded in laser products or laser systems assigned a lower hazard class because of engineering features, which limit accessible laser emissions. Thus, an embedded laser may be exempt from many control measures. However, the Approved Laser User must assure that:

- Only properly trained individuals' service the laser system.
- A temporary laser controlled area is established and posted during service.

7.3 Laser Classes Regulated by This Laser Safety Program

Only Class 3B and Class 4 lasers and laser systems are regulated by this Laser Safety Program. Only intra beam hazards are covered by this program. Non-beam hazards are not monitored under this program.

7.4 Requirements for Laser Classification

Class	Procedural & Administrative Controls	Training	Medical Surveillance	LSO
1	Not Required	Not Required	Not Required	Not Required
1M	Required	Application Dependent (2)	Application Dependent (2)	Application Dependent (2)
2	Not Required (1)	Not Required (1)	Not Required	Not Required
2M	Required	Application Dependent (2)	Application Dependent (2)	Application Dependent (2)
3R	Not Required (1)	Not Required (1)	Not Required	Not Required (1)
3B	Required	Required	Suggested	Required
4	Required	Required	Suggested	Required

Section 8

LASER BEAM HAZARDS

8.1 There are two categories of laser injuries:

- Thermal injuries- the laser energy absorbed by the tissue raises the tissue temperature enough to result in a burn. The skin or the eyes can be injured by laser burns and the extent of the injuries is dependant upon the wavelength and classification of the laser.
- Photochemical injuries- photon energy breaks molecular bonds causing injury to the skin or the eyes.

8.2 Eye Injuries

Acute exposure may result in corneal or retinal burns. Chronic exposures can result in cataract formation or retinal damage. Although damage to the retina can be pain free, retinal damage can result in partial or total blindness when the optic nerve is damaged. Retinal damage can be irreversible.

Eye Injuries at Various Wavelengths

<u>wavelength (um)</u>	<u>type of primary Injury</u>
0.18 - 0.4	UV- Thermal or photochemical injury to the cornea
0.4 - 0.6	Visible - Thermal or photochemical injury to retina
0.4 - 1.4	Retinal Hazard Region- explosive retinal effects from short pulses
0.6 - 0.7	Visible - Thermal injury to the retina
0.7 - 1.4	Near IR - Thermal injury to the retina
1.4 - 2.6	Far IR – Thermal injury to the cornea or lens
2.6 - 1000	Thermal injury to the cornea

* Laser-Professionals, Inc., Las Vegas, NV 89109

8.3 Skin Injuries

Acute thermal skin injuries can be first degree (reddening), second degree (blistering), or third degree burns (destruction of the skin and damage to the underlying tissue). Acute injury to the skin is usually repairable. Chronic exposure to low level UV light may result in skin cancers.

Section 9

MAXIMUM PERMISSIBLE EXPOSURE (MPE)

The Maximum Permissible Exposure (MPE) is defined as the level of laser radiation to which an unprotected person may be exposed without adverse biological changes to the eyes or the skin.

Section 10

NOMINAL HAZARD ZONE (NHZ)

The Nominal hazard Zone (NHZ) is defined; as the space within which the level of the direct, reflected, or scattered radiation may exceed the applicable MPE. The NHZ does not apply if the laser beam is totally enclosed. The NHZ should be known for any beam not totally enclosed. The LSO may declare the Laser Controlled Area as the NHZ.

Section 11

LASER CONTROLLED AREAS

Class 3B and Class 4 lasers may only be operated in designated laser controlled areas, approved by the LSO. The Laser Controlled Area is the area under direct supervision of the Approved Laser User. The purpose of Laser Controlled Areas is to confine the laser hazards to spaces under the Approved Laser User's control in order to prevent injury to personnel working or visiting the Laser Controlled Areas.

- Spectators should be prevented from entering the Laser Controlled Area during operation, maintenance, or service of the laser.
- Personnel authorized to enter Laser Controlled Areas shall be properly trained and must adhere to all applicable administrative, procedural, and operational controls.
- All personnel potentially exposed to hazardous levels of laser radiation shall wear appropriate protective eyewear.
- The area shall be posted with appropriate laser warning signs.
- At minimum, the Laser Controlled Area must encompass the area where the potential laser hazard is greater than the MPE.

Temporary Laser Controlled Area

The exterior boundary of a temporary Laser Controlled Area shall be posted in accordance with ANSI Z136.1-2007, Section 4.7 for appropriate warning signs and wording. The signal word "Notice" shall be used on signs posted outside a temporary Laser Controlled Area during periods of service.

Section 12

CONTROL MEASURES FOR BEAM HAZARDS

ANSI Z136.1-2007 requires control measures be devised to reduce the possibility of exposure of the eyes and the skin to hazardous levels of laser radiation and to other hazards associated with the operation of laser devices during operation and maintenance.

The types of control measures are engineering, administrative, and procedural controls. Engineering controls are safety features that are incorporated into the laser equipment. Administrative controls are policies that control and restrict access to laser radiation and include training requirements, audits, and authorized/approved users. Procedural controls assure safe operation of hazardous laser radiation and include SOP's for alignment, operation, and emergency as well as protocols for use of protective eyewear.

Control measures for beam hazards include the following:

- Laser Controlled Area.
- Eye protection.
- Barriers, shrouds, beam stops, etc.
- Administrative and procedural controls.
- Education and training.

The hierarchy of controls listed in the order of effectiveness are:

Substitute a low power laser for a high power one, if feasible. The minimum laser radiation for the application should be used. The higher the power, the more controls needed.

Engineering controls such as enclosures, interlocks, and beam stops, are very effective at eliminating hazards (if not defeated). Most engineering controls are in place.

Personal protection, especially eyewear, is effective when it is (1) the correct eyewear and (2) worn at the appropriate times.

Administrative controls, such as warning signs, training, and SOPs are reminders to laser operators and are unfortunately not as effective as engineering controls since they are often ignored or forgotten.

The LSO shall have the authority to monitor and enforce the control of laser hazards and conduct surveillance of the appropriate control measures.

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CONTROL MEASURES FOR BEAM HAZARDS

Laser Controls

Class 3B and Class 4 Requirements	Comments
Appropriate laser warning labels shall be affixed in a conspicuous place on the housing.	Labels are affixed by the manufacturer.
A master switch, operated by a key or a coded access, shall be provided.	Only authorized persons should have access to the key or code.
A protective housing shall be provided.	This applies to the housing of the laser, not the beam.
Interlocks on removable parts of housings shall be provided (or require a tool to remove). If the beam is totally enclosed, the enclosure shall be interlocked.	Interlocks need to be tested and results documented on a 6-month basis.
When the entire beam is not fully enclosed, the Nominal Hazard Zone shall be established by the LSO.	If the beam is totally enclosed, then determination of the NHZ is not required.
The LSO shall require approved written standard operating, and maintenance procedures.	No laser operators on campus are authorized to do service on lasers.
Alignment shall be performed to ensure that the eye is not exposed to laser radiation that exceeds the MPE.	<ul style="list-style-type: none">• Orient the beam so that it is not directed toward any door.• Orient the beam so that it is not directed upward during alignment or operation.• Locate the beam path so that it is not at eye level for person standing or sitting.
Training shall be provided for operators, maintenance, and service personnel.	No laser operators on campus are authorized to perform service on lasers.

Section 12

CONTROL MEASURES FOR BEAM HAZARDS

Control Measures for Laser Controlled Areas

Class 3B and Class 4 Requirements	Comments
Restricted to properly trained individuals, provided with appropriate protective equipment, and following all applicable controls	Only Authorized Laser Users shall operate the lasers.
Designed to allow rapid ingress/egress during emergencies.	The area should be free of clutter in case of fire or other emergencies.
Designed with one of the following: <ul style="list-style-type: none"> • Non-defeatable area/entryway safety controls • Defeatable area/entryway safety controls • Procedural area/entryway safety controls 	Interlocks on entryways are one way of meeting this requirement for open-beam systems. Some prefer to add a warning light, which informs persons entering of the status of laser use.
Equipped with a “panic button” which deactivates the laser.	Should be easily accessible
Posted with appropriate warning signs at the entryway.	
Operated by trained and authorized persons. Unattended use shall not be permitted.	
Under the direct supervision of an individual knowledgeable in laser safety.	This is the Approved laser user’s responsibility.
Located such that access by spectators is limited.	Spectators include nonauthorized / untrained people.
Provided with a permanently attached beam stop or attenuator.	Beam stop should be made of non-reflective material.
Have appropriate eye protection for all individuals within the area.	
Have the laser positioned such that the beam is not at eye level with a person seated or standing.	The laser should be secured so that it does not move if bumped.
Have all windows and doorways covered or restricted so that laser radiation above the MPE cannot exit the area.	Materials used as a barrier for Class 3B and Class 4 lasers must be fires retardant.
Require storage or disabling of the laser when not in use.	Removal of the key is easiest way to do this.

Section 12

CONTROL MEASURES FOR BEAM HAZARDS

Viewing Windows, Display Screens, and Collecting Optics

In order to adequately address additional protection requirement, it is sometimes necessary to utilize protective devices such as viewing windows, display screens, and laser barriers.

All viewing windows and diffuse (reflective or transmitted) display screens as an integral part of a laser or laser system shall incorporate a suitable means (such as interlocks and attenuators) to maintain the laser radiation at the viewing point at or below the applicable MPE.

All collecting optics (such as lenses, telescopes, and microscopes) that integrate the use of a laser or laser system shall incorporate suitable means (such as interlocks and filters) to maintain the laser radiation transmitted through the collecting optics to levels at or below the applicable MPE.

Section 13

MEDICAL SURVEILLANCE

At this time, pre-assignment eye examinations are not required just suggested. However, following a hazard evaluation and at the discretion of the LSO, medical surveillance (pre-assignment, post-assignment, or periodic) may be required.

Section 14

STANDARD OPERATING PROCEDURES (SOP's)

The Approved Laser User must provide written SOP's for all Class 3B and Class 4 lasers and laser systems for the LSO's review and approval prior to laser use. The approved SOP's shall be posted near the laser(s) and include the following:

- Alignment.
- Operation.
- Emergency.
- Required protective equipment/eyewear.
- Intra beam laser hazard identification and mitigation.

After reviewing an enclosed laser system, the LSO may reduce or waive the SOP's requirement.

All personnel working with lasers should review all SOP's annually to ensure accuracy and appropriateness of the procedures. This annual review is not required to be reported to the LSO if no new hazards have been added to the system. If new hazards have been added to the laser system, the Approved Laser User must notify the LSO so that the LSO may conduct a review to assure that necessary safeguards have been implemented.

Section 15

LASER SAFETY TIPS

- Locate laser beam at waist level or below. Do not place the beam at eye level.
- Close and cover your eyes when stooping down around the laser beam (where you will pass the beam at eye level).
- When leaning over the table, beware of the laser beam directed upward.
- Enclose as much of the beam as possible.
- Do not direct laser beam toward doors or windows.
- Terminate or reflect the laser beam with fire-resistant beam stops. Anodized aluminum painted black (which may not be necessarily fire-resistant) can work well for this purpose.
- Use surfaces that minimize specular reflections.
- Implement effective controls so that the Laser Operator is not exposed to laser intra beam hazards.
- Make sure warning/indicator lights can be seen through protective filters.
- If you can see the beam through your laser eyewear, you are not fully protected.
- View applications remotely.
- Do not wear watches or reflective jewelry around Class 3B or Class 4 lasers.
- In reality, all interlocks are defeatable.
- The best defense is good understanding of the intra beam laser hazards.
- For alignment:
 - Isolate Process.
 - Use lowest practical power.
 - View diffuse reflections only.
 - Use IR/UV viewing cards/eyewear.
 - Where possible, use low power HeNe laser.