



Specialty Technical Publishers
PRACTICAL COMPLIANCE & AUDIT SOLUTIONS

Sample Laser Safety Auditing

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Laser Safety Auditing

Laser Safety Auditing

A tool to provide guidance for users of lasers and laser systems in general industry, where there are no OSHA regulations that cover laser usage.

Users of This Guide Include

- **Any company operating lasers**
- **Any facility employing a laser safety officer**
- **Any business that employs personnel who work with, or could be exposed to, laser radiation in excess of Class 1**
- **And many more...**

Features of This Guide

- **Field-tested by recognized experts**
- **Helps ensure compliance**
- **Helps avoid citations and fines**
- **Allows experienced auditors to expedite their assessment**
- **Allows less experienced auditors to review detailed instructions**

Features of This Guide

- **Saves time and reduces compliance and audit costs**
- **Demonstrates due diligence**
- **Customizable to site-specific requirements**
- **Applicability Tables**
- **Pre-audit Preparation**
- **Rulebooks**
- **Scoresheets**

Comprehensive Topic Areas

- **Laser safety programs**
- **Control measures**
- **Personal Protective Equipment**
- **Education and training**
- **Medical examinations**
- **Criteria for exposures to eyes or skin**
- **Non-beam hazards**

Comprehensive Topic Areas

- ANSI Z136.1-2014

Features – Applicability Tables

Use multi-level questions to quickly determine which sections of the rulebook apply to specific facilities or operations

Sample Applicability Table

Applicability of This Module

Use the following General Applicability Checklist to determine whether a rulebook and its sections apply to your operation.

If you answer YES to the rulebook question, the rulebook applies to you *unless you answer YES for a rulebook exemption*.

Once you determine that the rulebook does apply to your operation, you must answer the section questions. If a section question does not exist, then that section applies if the rulebook applies. If you answer YES to a section question, that section applies to you *unless you answer YES for an exemption from that section*. If you answer YES to a rulebook or section exemption, then the rulebook or section does not apply.

GENERAL APPLICABILITY CHECKLIST	Applies		Exempt
Rulebook: Laser Safety			
RULEBOOK: Do you have any lasers?	Y	N	
	q	q	
Section 1: Do you have a laser that has not been classified by the manufacturer, or have you modified a laser?	Y	N	
	q	q	
Section 2: Do you have any Class 1M, Class 2, Class 2M, Class 3R, Class 3B, or Class 4 lasers? NOTE: Users of Class 1 lasers are encouraged to also review this section to determine if it is appropriate to implement any of the elements as Best Practices.	Y	N	
	q	q	
Section 3: Do you have any Class 1M, Class 2, Class 2M, Class 3R, Class 3B, or Class 4 lasers? NOTE: This section discusses general control measures for laser safety.	Y	N	
	q	q	
Section 4: Section applies unless you qualify for a section exemption.			
Section 5: Do you have Class 3B or Class 4 lasers?	Y	N	
	q	q	
Section 6: Section applies unless you qualify for a section exemption.			
Section 7: Do you have Class 3B or Class 4 lasers, or could protective controls on lower class lasers be overridden temporarily during activities such as maintenance or servicing? NOTE: This section discusses engineering and administrative controls for controlled areas.	Y	N	
	q	q	
Section 8: Do you have Class 3B or Class 4 lasers? NOTE: This section discusses administrative and procedural control measures.	Y	N	
	q	q	

Features – Pre-audit Preparation

Lists materials to be reviewed or prepared before conducting an audit

Sample Pre-audit Preparation

LASER SAFETY



PART 2: PRE-AUDIT PREPARATION

Items to consider getting in advance:

- Inventory of types and locations of lasers at the site.
- Laser safety program.
- Access to ANSI Z136.1-2014: American National Standard for Safe Use of Lasers.
- Access to additional ANSI Z136 series standards as appropriate to the type of facility/operation being audited.
- Access to the information found in 29 CFR 1926.54.

Items to have facility personnel prepare or gather in advance:

- Employee training records.
- Any accident reports involving lasers.
- Employee medical records, if there is a medical surveillance program or if there have been any laser-related exposures.
- Laser safety program, if required.

Features – Rulebooks

Provides guidance on the responsibilities, requirements and recommendations for operating lasers

Sample Rulebook

LASER SAFETY

PART 3: RULEBOOK

1. Hazard Evaluation and Classification

The basis of hazard classification of lasers is the ability of the laser beam to cause biological damage to the eye or skin during use. There are 3 sets of standards for classification of laser systems: International Electrotechnical Commission (IEC) 60825-1 and the U.S. Federal Laser Product Performance Standard (FLPPS) (both of which apply to manufacturers of lasers), and ANSI Z136.1-2014 (which sets requirements for how users must classify lasers).

In general, classification is the responsibility of the manufacturer (or its agent), although the user would be required to reevaluate and reclassify the laser if modifications are made. ANSI Z136.1-2014 states that the manufacturer's classification, if conducted in accordance with the FLPPS or IEC 60825-1, may be considered to fulfill the classification requirements of the ANSI standard.

- 1.1** Each laser must be evaluated to determine whether the radiation emissions from the laser beam have the ability to cause biological damage to the eye or skin during use of the equipment, and classified based on that evaluation.

Guide Note

- In general, lasers and laser systems will be evaluated and classified by the manufacturer. The organization may rely on this classification, as long as it does not make any modifications (ANSI Z136.1-2014 Section 3.1).
- Laser classification categories vary slightly among ANSI Z136.1, FLPPS, and IEC 60825-1, and also from one edition of the standards to another. Table 1 shows a comparison of the classes under the most recent editions of the 3 standards. Note that there are no requirements to reassess lasers that were classified under previous versions of the standards (ANSI Z136.1-2014 Appendix J).

Class	IEC 60825-1:2014 (third edition)	FLPPS	ANSI Z136.1-2014
1	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. This does not apply to service periods requiring access to Class 1 enclosures containing higher-class lasers.		
1M	Not known to cause eye or skin damage unless collecting optics are used.	N/A	Considered incapable of producing hazardous exposure unless viewed with collecting optics.
1C	Lasers designed for treatment of the skin or internal tissue in contact or close to the skin, where the product is designed to be safe for the eye (e.g., for hair removal, wrinkle reduction, etc.).	N/A	N/A

Features – Scoresheets

Enable quick recording of a facility's compliance status for each requirement

Scoresheets are customizable

Sample Scoresheet

LASER SAFETY

PART 4: SCORESHEET

SITE:

DATE:

1. Hazard Evaluation and Classification	N/A	Complies	Does not comply
1.1 Each laser must be evaluated to determine whether the radiation emissions from the laser beam have the ability to cause biological damage to the eye or skin during use of the equipment, and classified based on that evaluation.	q	q	q
1.2 If the user modifies the laser, it must reevaluate the equipment and reclassify it as needed.	q	q	q
2. Laser Safety Programs	N/A	Complies	Does not comply
2.1 The employer is responsible for implementing a laser safety program that includes program elements specific to the classification of each laser.	q	q	q
2.2 Where a laser safety program is required, it must include certain provisions.	q	q	q
2.3 Other personnel should have specific duties assigned in support of the laser safety program.	q	q	q
3. Control Measures – General	N/A	Complies	Does not comply
3.1 Appropriate control measures must be implemented to ensure that no-one is exposed to laser radiation levels exceeding the Maximum Permissible Exposures (MPEs) under any reasonably foreseeable conditions of operation.	q	q	q
3.2 Control measures must be implemented according to a hierarchy of effectiveness.	q	q	q
3.3 The LSO may specify alternate control measures.	q	q	q
3.4 Additional user control measures may be required in certain circumstances.	q	q	q
3.5 Additional labels and warning signs may be required for unsupervised lasers.	q	q	q

Formats

- **Online single-user**
- **Online multi-user**
- **Multi-user through risk management systems**

Updated periodically

Sample Release Notes



Specialty Technical Publishers
PRACTICAL COMPLIANCE & AUDIT SOLUTIONS

release notes
please review

Laser Safety Auditing

RELEASE 101 – JUNE 2017

new & noteworthy

- **New Guide:** This entirely new guide addresses the responsibilities, requirements, and recommendations for operating lasers in accordance with international consensus standards. It is intended to provide guidance for users of lasers and laser systems in general industry, where there are no OSHA regulations that cover laser usage. It does not address compliance with the OSHA standard for nonionizing radiation at 29 CFR 1926.54, which applies to lasers used in construction operations and in the power generation, transmission, and distribution installations of electric utilities, as well as equivalent installations of industrial establishments.

In preparing this guide, all major international consensus standards related to lasers were considered. The module includes a brief discussion of the requirements for laser manufacturers under the U.S. Food and Drug Administration's Federal Laser Product Performance Standard at 21 CFR 1041.10 and the International Electrotechnical Commission's IEC 60825-1, Safety of Laser Products—Part 1: Equipment Classification and Requirements. At this time, there is no international standard that governs users of lasers, so only the requirements and recommendations of the American National Standard for Safe Use of Lasers (ANSI Z136.1-2014) are discussed in any detail.

LASER SAFETY AUDITING

PART 1: INTRODUCTION

Applicability of This Module

Use the following General Applicability Checklist to determine whether a rulebook and its sections apply to your operation.

If you answer YES to the rulebook question, the rulebook applies to you *unless you answer YES for a rulebook exemption*.

Once you determine that the rulebook does apply to your operation, you must answer the section questions. If a section question does not exist, then that section applies if the rulebook applies. If you answer YES to a section question, that section applies to you *unless you answer YES for an exemption from that section*. If you answer YES to a rulebook or section exemption, then the rulebook or section does not apply.

GENERAL APPLICABILITY CHECKLIST	Applies		Exempt
Rulebook: Laser Safety			
RULEBOOK: Do you have any lasers?	Y	N	
.....	q	q	
Section 1: Do you have a laser that has not been classified by the manufacturer, or have you modified a laser?	Y	N	
.....	q	q	
Section 2: Do you have any Class 1M, Class 2, Class 2M, Class 3R, Class 3B, or Class 4 lasers?	Y	N	
.....	q	q	
NOTE: Users of Class 1 lasers are encouraged to also review this section to determine if it is appropriate to implement any of the elements as Best Practices.			
Section 3: Do you have any Class 1M, Class 2, Class 2M, Class 3R, Class 3B, or Class 4 lasers?	Y	N	
.....	q	q	
NOTE: This section discusses general control measures for laser safety.			
Section 4: Section applies unless you qualify for a section exemption.			
.....			
Section 5: Do you have Class 3B or Class 4 lasers?	Y	N	
.....	q	q	
Section 6: Section applies unless you qualify for a section exemption.			
.....			
Section 7: Do you have Class 3B or Class 4 lasers, or could protective controls on lower class lasers be overridden temporarily during activities such as maintenance or servicing?	Y	N	
.....	q	q	
NOTE: This section discusses engineering and administrative controls for controlled areas.			
Section 8: Do you have Class 3B or Class 4 lasers?	Y	N	
.....	q	q	
NOTE: This section discusses administrative and procedural control measures.			

Laser Safety Auditing Introduction

GENERAL APPLICABILITY CHECKLIST	Applies	Exempt
Section 9: Do you use lasers in any of the following specialized circumstances: <ul style="list-style-type: none"> • laser demonstrations involving the general public; • connection or disconnection of laser optical fiber transmission systems; • Class 3B or Class 4 lasers used in conjunction with robots; • ultraviolet (UV) lasers; or • laser pointers? 	Y N q q	
Section 10: Do you use any Class 3B, Class 4, or UV lasers, or do you use Class 2 or Class 3R lasers in circumstances where direct viewing is required for periods longer than 0.25 seconds?	Y N q q	
Section 11: Do you have any of the following types of employees: <ul style="list-style-type: none"> • a laser safety officer; or • operators, technicians, engineers, or maintenance and service personnel who work with, or are potentially exposed to, laser radiation in excess of Class 1? 	Y N q q	
Section 12: Section applies unless you qualify for a section exemption.		
Section 13: Do you have any Class 3B or Class 4 lasers?	Y N q q	
Section 14: Do you have any Class 1M, Class 2, Class 2M, Class 3R, Class 3B, or Class 4 lasers? NOTE: Users of Class 1 lasers are encouraged to review this section to determine if it is appropriate to consider any of the elements as Best Practices.	Y N q q	

Regulatory Summary

Introduction to Laser Safety

The American National Standards Institute (ANSI) provides guidance for the safe use of lasers and laser systems that operate at wavelengths between 0.18 μm and 1 mm in the American National Standard for Safe Use of Lasers (ANSI Z136.1-2014). Its objective is to ensure that this guidance is reasonable and adequate by classifying lasers according to their relative hazards, and then specifying appropriate control measures for each hazard classification. Hazard classification is based on the ability of the laser beam to cause biological damage to the eye or skin during use. The classes of lasers are as follows:

- Class 1: Considered to be incapable of producing damaging radiation levels during operation, and exempt from any control measures.
- Class 1M: Safe for viewing directly with the naked eye, but may be hazardous to view directly with the aid of optical instruments (“M” stands for Magnifying Optics Caution).
- Class 2: Emits in the visible portion of the spectrum (400 – 700nm) and eye protection is normally afforded by the aversion response.
- Class 2M: Emits in the visible portion of the spectrum (400 – 700nm). Total output is in excess of that normally permitted for Class 2, but are safe for accidental viewing during normal use as long as the natural aversion response is not overcome. May be hazardous to the eyes if viewed with collecting optics.
- Class 3R: Has reduced control requirements and is potentially hazardous under some direct and specular reflection viewing conditions if the eye is appropriately focused and stable, but the probability of an actual injury is small. Will not pose either a fire hazard or diffuse reflection hazard.

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LASER SAFETY

PART 2: PRE-AUDIT PREPARATION

Items to consider getting in advance:

- Inventory of types and locations of lasers at the site.
- Laser safety program.
- Access to ANSI Z136.1-2014: American National Standard for Safe Use of Lasers.
- Access to additional ANSI Z136 series standards as appropriate to the type of facility/operation being audited.
- Access to the information found in 29 CFR 1926.54.

Items to have facility personnel prepare or gather in advance:

- Employee training records.
- Any accident reports involving lasers.
- Employee medical records, if there is a medical surveillance program or if there have been any laser-related exposures.
- Laser safety program, if required.

Laser Safety Pre-audit Preparation

Acronyms and Abbreviations Used in This Module

AEL	accessible emission limit	LEP	laser eye protection
ANSI	American National Standards Institute	LGAC	laser generated air contaminants
CDRH	Center for Devices and Radiological Health	LSO	laser safety officer
CFR	Code of Federal Regulations	LTIR	laser target interaction radiation
CPR	cardiopulmonary resuscitation	NBH	non-beam hazard
cm	centimeter(s)	NHZ	nominal hazard zone
DMSO	dimethylsulfoxide	mm	millimeter(s)
EPA	Environmental Protection Agency	MPE	maximum permissible exposure
FAA	Federal Aviation Association	mW	milliwatt(s)
FDA	Food and Drug Administration	μm	micrometer(s)
FLPPS	Federal Laser Product Performance Standard	NFPA	National Fire Protection Association
HMIS	Hazardous Materials Identification System	nm	nanometer(s)
IEC	International Electrotechnical Commission	OD	optical density
IR	infrared	OSHA	Occupational Safety and Health Administration
LCA	laser controlled area	PPE	personal protective equipment
		RF	radio frequency
		SOP	Standard Operating Procedure
		UV	ultraviolet
		W	watt(s)

LASER SAFETY

PART 3: RULEBOOK

1. Hazard Evaluation and Classification

The basis of hazard classification of lasers is the ability of the laser beam to cause biological damage to the eye or skin during use. There are 3 sets of standards for classification of laser systems: International Electrotechnical Commission (IEC) 60825-1 and the U.S. Federal Laser Product Performance Standard (FLPPS) (both of which apply to manufacturers of lasers), and ANSI Z136.1-2014 (which sets requirements for how users must classify lasers).

In general, classification is the responsibility of the manufacturer (or its agent), although the user would be required to reevaluate and reclassify the laser if modifications are made. ANSI Z136.1-2014 states that the manufacturer's classification, if conducted in accordance with the FLPPS or IEC 60825-1, may be considered to fulfill the classification requirements of the ANSI standard.

- 1.1** Each laser must be evaluated to determine whether the radiation emissions from the laser beam have the ability to cause biological damage to the eye or skin during use of the equipment, and classified based on that evaluation.

Guide Note

- In general, lasers and laser systems will be evaluated and classified by the manufacturer. The organization may rely on this classification, as long as it does not make any modifications (ANSI Z136.1-2014 Section 3.1).
- Laser classification categories vary slightly among ANSI Z136.1, FLPPS, and IEC 60825-1, and also from one edition of the standards to another. Table 1 shows a comparison of the classes under the most recent editions of the 3 standards. Note that there are no requirements to reassess lasers that were classified under previous versions of the standards (ANSI Z136.1-2014 Appendix J).

Class	IEC 60825-1:2014 (third edition)	FLPPS	ANSI Z136.1-2014
1	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. This does not apply to service periods requiring access to Class 1 enclosures containing higher-class lasers.		
1M	Not known to cause eye or skin damage unless collecting optics are used.	N/A	Considered incapable of producing hazardous exposure unless viewed with collecting optics.
1C	Lasers designed for treatment of the skin or internal tissue in contact or close to the skin, where the product is designed to be safe for the eye (e.g., for hair removal, wrinkle reduction, etc.).	N/A	N/A

Table 1: Requirements by Laser Classification			
Class	IEC 60825-1:2014 (third edition)	FLPPS	ANSI Z136.1-2014
IIa	N/A	Visible lasers that are not intended for viewing and cannot produce any known eye or skin injury during operation based on a maximum exposure time of 1000 seconds.	N/A
2	Visible lasers considered incapable of emitting laser radiation at levels that are known to cause skin or eye injury within the period of human eye aversion response (0.5 seconds).		
2M	Not known to cause eye or skin damage within the aversion response time, unless collecting optics are used.	N/A	Emits in the visible portion of the spectrum, and is potentially hazardous if viewed with collecting optics.
IIIa	N/A	Lasers similar to Class 2 with the exception that collecting optics cannot be used to view the beam. Visible only.	N/A
3R	Replaces Class 3a and has different limits. Up to 5 times the Class 2 limit for visible and 5 times the Class 1 limits for invisible.	N/A	A laser system that is potentially hazardous under some direct and specular deflection viewing conditions if the eye is appropriately focused and stable.
3B	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 wavelength regions.		
4	High-powered lasers (visible or invisible regions) considered to present potential acute hazard to the eye and skin for both intrabeam (direct) or specular (mirror-like) conditions. Also have potential for fire (ignition) and byproduct emissions from target or process materials.		

Source: ANSI Z136.1-2014 Table J2

1.2 If the user modifies the laser, it must reevaluate the equipment and reclassify it as needed.

Guide Note

- According to ANSI Z136.1-2014, only personnel trained in laser safety, optical engineering, physics, or a related field are suited to perform the detailed hazard evaluation calculations or classification determinations of a laser or laser system. The hazard class must be assigned based on the laser or laser system’s capability of injuring personnel. The laser safety officer (LSO) has primary responsibility for evaluation and classification, but may not have the appropriate qualifications and therefore may choose to delegate the responsibility. In general, hazard evaluation looks at the following (ANSI Z136.1-2014 Section 3.1):
 - the laser or laser system’s capability of injuring personnel or interfering with task performance;
 - the environment in which the laser is used, including access to the beam path;
 - the personnel who may use or be exposed to laser radiation; and
 - other non-beam hazards.

- If a laser or laser system has been modified in any way from the manufacturer’s design or intended use, verify that it was evaluated for the need for reclassification (ANSI Z136.1-2014 Sections 1.2 and 3).
- If a laser or laser system has been reevaluated and reclassified for any reason, verify that such work was done by personnel with the appropriate expertise, following the requirements of the version ANSI Z136.1, IEC 60825-1, or FLPPS in effect at the time that the reevaluation/reclassification was conducted (ANSI Z136.1-2014 Sections 1.2 and 3).

NOTE: The details of how to conduct the evaluation and classification are highly technical, and beyond the scope of this guide.

2. Laser Safety Programs

2.1 The employer is responsible for implementing a laser safety program that includes program elements specific to the classification of each laser.

Guide Note

- ANSI Z136.1-2014 requires a laser safety program with certain elements, depending on the laser classification. Table 2.1 provides a guide to the elements that are typically required for each class of laser (ANSI Z136.1-2014 Sections 1.2 and 1.3.1).

Class	Control Measures	Training	Laser Safety Officer	Engineering Controls
1	Not Required	Not Required	Not Required	Not Required
1M	Required	Application Dependent ^a	Application Dependent ^a	Application Dependent ^a
2	Not Required ^b	Not Required ^b	Not Required	Not Required ^b
2M	Required	Application Dependent ^a	Application Dependent ^a	Application Dependent ^a
3R	Not Required ^b	Not Required ^b	Not Required ^b	Not Required ^b
3B	Required	Required	Required	Required
4	Required	Required	Required	Required

NOTE: During maintenance and service, the classification associated with the maximum level of laser radiation shall be used to determine the applicable control measures.

Source: ANSI Z136.1-2014 Table 1.1

NOTES:

^a Certain uses of Class 1M or 2M lasers or laser systems that exceed Class 1 or Class 2 because they do not satisfy measurement Condition 1 may require hazard evaluation and/or manufacturer’s information (see Section 4.1 of ANSI Z136.1-2014).

^b Not required except for conditions of intentional intrabeam exposure applications.

2.2 Where a laser safety program is required, it must include certain provisions.

Guide Note

- Under ANSI Z136.1-2014, a Laser Safety Officer (LSO) is required under certain circumstances. If the facility has designated a LSO (required or not), verify that this person has the authority and responsibility for the following duties (ANSI Z136.1-2014 Section 1.3.2(a) and Appendix A Section A1):
 - establishing and maintaining adequate policies and procedures for the control of laser hazards that comply with applicable requirements, including federal, state, and local regulations;
 - classifying, or verifying classifications of, lasers and laser systems used under the LSO’s jurisdiction;
 - hazard evaluation of laser work areas;
 - ensuring that the prescribed control measures are implemented and kept in effect, including avoiding unnecessary or duplicate controls, and recommending or approving substitute or alternate control measures when the primary ones are not feasible or practical;

Laser Safety Rulebook

- approving Class 3B and Class 4 Standard Operating Procedures (SOPs) that may be part of the requirements for administrative and procedural controls;
- recommending or approving appropriate protective equipment such as eyewear, clothing, barriers, and screens, that may be required to ensure personnel safety, and conducting periodic audits to assure that the protective equipment is in working order;
- reviewing the wording on area warning signs and equipment labels;
- reviewing Class 3B and Class 4 laser installations, facilities, and laser equipment, including modifications of existing facilities or equipment, prior to use;

NOTE: Approval for operation of a Class 3B and Class 4 laser or laser system may be given only if the LSO is satisfied that the laser hazard control measures are adequate. These include SOPs for maintenance and service operations for Class 3B and Class 4 laser systems. The procedures should include adequate consideration of non-beam hazards.

- ensuring that adequate safety education and training are provided to laser personnel;
- implementing medical surveillance when appropriate (see section 12);
- ensuring that necessary records are maintained, including:
 - 1) those required by applicable government regulations;
 - 2) medical surveillance records; and
 - 3) other records documenting the safety program, such as training records, audits and SOP approvals.
- periodically auditing or inspecting for the presence and functionality of the laser safety features and control measures for each Class 3B and Class 4 laser or laser system in the facilities, and ensuring corrective action is taken where required;
- accompanying regulatory agency inspectors (such as OSHA, FDA, or state or local agencies) during review of the safety program or investigation an incident, documenting any discrepancies or issues noted, and ensuring corrective action is taken where required; and
- developing a plan to respond to notifications of incidents or of actual or suspected exposure to potentially harmful laser radiation, including provision of medical assistance for any potentially exposed individual, provisions for investigation the incident, and documents for reporting the results of the investigation.

NOTE: ANSI Z136.1-2014 assumes that the LSO either personally performs the specified duties/responsibilities, or assures that each task is performed by qualified individual(s). It also emphasizes that the LSO must have sufficient authority to go with accompany the assigned responsibilities, including the authority to suspend, restrict, or terminate operation of a laser system if he/she deems that the laser hazard controls are inadequate. The LSO may be a part-time position if the workload does not require full-time effort. If necessary, a Deputy LSO must be appointed to perform duties when the LSO is not available.

- Verify that the program includes appropriate education of authorized personnel (LSOs, operators, service personnel, and others) in the safe use of lasers and, as applicable, the assessment and control of laser hazards (ANSI Z136.1-2014 Section 1.3.2(b)).

NOTE 1: Education may be accomplished through training programs. Employers should consider providing awareness training for all employees working with and around lasers and laser systems greater than Class 1.

NOTE 2: If training is warranted for embedded lasers, it must be provided to those routinely around the systems who will be present during maintenance requiring beam access or service.

- Confirm that adequate protective measures for the control of laser hazards are provided, as described in sections 3 – 10 (ANSI Z136.1-2014 Section 1.3.2(c)).
- Verify that there is an accident/incident investigation procedure that includes reporting of all incidents to the LSO, and preparation of plans for prevention of future accidents following a known or suspected incident (ANSI Z136.1-2014 Section 1.3.2(d)).
- Verify that appropriate medical examinations are considered in accordance with section 12 (ANSI Z136.1-2014 Section 1.3.2(e)).
- Determine whether the number, hazards, complexity, and/or diversity of laser activities warrants formation of a Laser Safety Committee (ANSI Z136.1-2014 Section 1.3.2(f)).

NOTE: The formation of a laser safety committee is considered optional, and ANSI Z136.1-2014 does not provide any additional guidance regarding how to determine if a committee should be formed. The auditor should verify that the facility considered the need for a committee, and evaluate the overall adequacy of resources devoted to supporting the LSO in order to determine if an appropriate decision was made. If a Laser Safety Committee does exist, consult ANSI Z136.1-2014 Appendix A Section A2 for guidance as to the possible makeup of the committee, as well as duties and standards that committee members must meet.

2.3 Other personnel should have specific duties assigned in support of the laser safety program.

Guide Note

- ANSI Z136.1-2014 states that employees who work with lasers or laser systems have responsibilities for establishing the safe use of lasers within their purview.
- Supervisors of individuals working with or having the potential for exposure to greater than Class 1 laser radiation should have a basic overall knowledge of laser safety program requirements for the lasers under their authority. It is recommended that they be assigned responsibility for at least the following (ANSI Z136.1-2014 Appendix A Section A3.1):
 - issuing appropriate instructions and training materials on laser hazards and their control to all personnel who may work with laser equipment within the supervisor’s jurisdiction;
 - prohibiting the operation of a laser unless there is adequate control of laser hazards to prevent exposure to employees, visitors, and the general public;
 - submitting to the LSO the names of individuals scheduled to work with lasers, as well as any additional information requested by the LOS for training completion;
 - immediately implementing the accident response plan (including notifying the LSO) upon becoming aware, or suspecting, that an accident has resulted from a laser operated under the supervisor’s authority;
 - assisting in obtaining appropriate medical attention for any employee involved in a laser accident, if necessary;
 - prohibiting operation of a new or modified Class 3B or Class 4 laser until it has been approved by the LSO;
 - providing the LSO with plans for new Class 3B and Class 4 laser installations or modifications to existing installations; and
 - being familiar with the standard operating procedures for Class 3B and Class 4 lasers and laser systems, and ensuring that these procedures are provided to users of such lasers.
- It is suggested that employees working with lasers or laser systems be assigned responsibility for at least the following (ANSI Z136.1-2014 Appendix A Section A3.2):
 - not energizing or working with or near a laser unless the employee has been authorized to do so by the supervisor for that laser;
 - being familiar with all applicable operating procedures and complying with safety rules and procedures as prescribed by the supervisor and the LSO; and
 - immediately informing the supervisor upon becoming aware, or suspecting, that an accident has occurred involving any laser, and that such accident has (or could potentially have) caused an injury. If the supervisor is not available, the employee must notify the LSO.
- Individuals responsible for purchasing lasers and laser systems, including, but not limited to, purchasing, accounting, and building management personnel, should be aware that they should contact the LSO to aid in the implementation of the laser safety program (ANSI Z136.1-2014 Section 1.3.3 and Appendix A Section A3.3).
- Individuals responsible for fabricating, altering or installing a Class 3B or 4 laser or laser system should be aware that they should contact the LSO to aid in the implementation of the laser safety program (ANSI Z136.1-2014 Section 1.3.3).

Pages have been removed from this sample.

LASER SAFETY

PART 4: SCORESHEET

SITE:

DATE:

1.	Hazard Evaluation and Classification	N/A	Complies	Does not comply
1.1	Each laser must be evaluated to determine whether the radiation emissions from the laser beam have the ability to cause biological damage to the eye or skin during use of the equipment, and classified based on that evaluation.	q	q	q
1.2	If the user modifies the laser, it must reevaluate the equipment and reclassify it as needed.	q	q	q
2.	Laser Safety Programs	N/A	Complies	Does not comply
2.1	The employer is responsible for implementing a laser safety program that includes program elements specific to the classification of each laser.	q	q	q
2.2	Where a laser safety program is required, it must include certain provisions.	q	q	q
2.3	Other personnel should have specific duties assigned in support of the laser safety program.	q	q	q
3.	Control Measures – General	N/A	Complies	Does not comply
3.1	Appropriate control measures must be implemented to ensure that no-one is exposed to laser radiation levels exceeding the Maximum Permissible Exposures (MPEs) under any reasonably foreseeable conditions of operation.	q	q	q
3.2	Control measures must be implemented according to a hierarchy of effectiveness.	q	q	q
3.3	The LSO may specify alternate control measures.	q	q	q
3.4	Additional user control measures may be required in certain circumstances.	q	q	q
3.5	Additional labels and warning signs may be required for unsupervised lasers.	q	q	q
4.	Control Measures – Engineering Controls for All Classes of Lasers	N/A	Complies	Does not comply
4.1	Certain requirements must be met where the user is required to implement additional engineering controls.	q	q	q
4.2	Lasers of all classes must be provided with a protective housing.	q	q	q
4.3	Viewing windows and diffuse display screens must meet certain requirements.	q	q	q
4.4	Collecting optics that incorporate a laser must have certain engineering controls.	q	q	q
4.5	Scanning devices must meet certain requirements.	q	q	q
4.6	Outdoor use of any class of laser must meet certain requirements.	q	q	q

Pages have been removed from this sample.

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