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# PURPOSE

To establish the minimum requirements necessary to implement laser safety practices and procedures that help ensure the safety of individuals from injuries caused directly or indirectly by laser systems or laser products.

# SCOPE

The provisions of this standard apply to all laser systems or laser products used by employees, contractors, sub-contractors, equipment manufacturer’s representatives, or visitors at Texas Instruments sites worldwide. This standard also applies to TI businesses that design or manufacture lasers or laser products.

# reference documents

## [International Electrical Commission (IEC) Publication 60825-1](http://webstore.iec.ch/webstore/webstore.nsf/searchview/?searchView=&SearchOrder=4&SearchWV=TRUE&SearchMax=1000&Submit=OK&Query=(%5BHead_Number%5D=%221%22)%20AND%20(%5BDocument_Name%5D%20CONTAINS%20%2260825-1%22)), "Safety Of Laser Products - Part 1: Equipment Classification, Requirements, And User's Guide"

## [International Electrical Commission (IEC) Publication 60825-1](http://webstore.iec.ch/webstore/webstore.nsf/searchview/?searchView=&SearchOrder=4&SearchWV=TRUE&SearchMax=1000&Submit=OK&Query=(%5BHead_Number%5D=%221%22)%20AND%20(%5BDocument_Name%5D%20CONTAINS%20%2260825-14%22))4, "Safety of laser products - Part 14: A User's Guide"

## [American National Standards Institute, ANSI Z136.1](http://webstore.ansi.org/ansidocstore/product.asp?sku=ANSI+Z136%2E1%2D2000), "Standards for the Safe Use of Lasers"

## TI Standard Policy & Procedure [04-04-01, "Environmental, Safety, Health"](https://giant.sc.ti.com/OBIS/wwpr.nsf/b3e7f6d26afb1519862567610007b6ed/175c9d3fa21585da062568c0006b2230?OpenDocument)

## TI SP&P 04-07-01, Records Retention

# DEFINITIONS

The definitions for ESH Standard 10.01 are generic for their usage with lasers. For specific definitions that may apply to the site or process, refer to the reference documents (e.g. ANSI, IEC, or Local Regulations) that apply to the site Laser Safety Program.

[TI ESH Standards Glossary of Definitions](https://sps01.itg.ti.com/sites/wwf/esh/standards/Knowledge_Bank/00.01.xls)

Note: Laser hazard classifications provided in this standard are from the “revised” laser hazard classification system used by IEC 60825 and ANSI Z136.1, "old system" laser classes are shown in parentheses [ ( ) ].

# REQUIREMENTS

## General

### Sites shall select laser products based on the lowest laser product class available that adequately performs the intended function;

### Sites shall ensure the acquisition of any Class 3b or Class 4 laser source meets the expectation of the standard.

### Sites shall limit the installation of laser products in open access areas to Class 1 (I) or 2 (II) systems. Portable Class 3R (IIIa) laser products may be used in open access areas with proper user precautions. Class 3B and Class 4 laser products shall follow the procedures detailed in section 5.3.

Note:

Equipment containing an enclosed Class 3B or 4 laser may be classified as a Class 2 system if the system also contains a Class 2 laser that emits visible light under normal operating conditions. Class 1 and Class 2 systems are safe to operate in open areas. Personal laser products (e.g., laser pointers) at or above Class 3B may not be used on TI property

### Sites shall maintain laser product safety features within the manufacturer's specifications.

## Process

Each site that engages in laser-related work shall implement laser safety practices and procedures. The practices and procedures shall include, at a minimum, the following provisions for the safe use of laser products unless local or country regulatory requirements take precedence:

### Adequate training (described in section 5.5.2) of operators, users, and maintenance/service personnel prior to working with laser products;

### Implementation of engineering and administrative control measure(s);

### Provisions for a medical surveillance baseline and appropriate records maintenance for individuals assigned laser-related work when potentially exposed to open-beam Class 3B (IIIb) or Class 4 (IV) laser radiation;

#### The site medical consultant shall determine the appropriate exam protocols for medical surveillance. (Note: ANSI Z136.1 provides guidance.)

### Evaluation of laser hazards and review of control measures;

### Recommendation of laser system restriction or suspension of operation to management, when necessary;

### Establishment of training requirements for employees who use, maintain, or service lasers;

### Maintenance of an accurate inventory of Class 3B (IIIb) and 4 (IV) laser products;

#### Lower power lasers (classes 1 [I] through 3R [IIIa]) do not need to be maintained on the inventory list, unless required by local regulations, site ESH, or designated laser safety person (e.g., tracking of embedded class 3B [IIIb] and 4 [IV] lasers).

### Communication of regulatory or program changes, confirmed or suspected injuries, or other issues related to the appropriate laser safety organization (e.g., to WWF ESH Services or regulatory agencies).

### Reporting unsafe conditions or unsafe work practices and laser-related eye or skin exposures above the maximum permitted exposure to site ESH or designated laser safety person.

### Reporting the following information to site ESH or designated laser safety person:

#### Receipt, transfer or disposal of laser products before arrival or departure;

#### Changes in the job status of persons assigned laser-related work;

#### Confirmed or suspected injuries (include obtaining medical assistance for the worker), and;

#### Plans to purchase, transfer or modify a laser product (before implementation).

### Eye exposure incidents which require a medical exam must be reported to the Medical Surveillance Program Administrator and Medical Director within two working days and communicated through [medicalsurveillance@list.ti.com](mailto:medicalsurveillance@list.ti.com)

## Control of exposure

### Class 3B (IIIb) laser products shall be in a Class 1 enclosure in open areas and installed in ‘laser controlled areas’ (see requirements noted in Section 5.3.2), or otherwise controlled through the following means:

#### Assessed by a TI Laser Safety Officer (LSO) or designated laser safety person to determine necessary controls

#### Control measures documented through a risk assessment and archived

#### Nominal Hazard Zone (NHZ) must be determined and properly communicated;

#### Engineering controls shall be the primary means to control exposures below the maximum permissible exposure (MPE);

#### Administrative controls (e.g., training, procedures, limited access, signage) may be used as a means to limit exposures when engineering controls alone are inadequate or impractical.

### Class 4 (IV) laser products shall be in a Class 1 enclosure in open areas or otherwise installed in “laser controlled areas.”  Laser controlled areas shall include the following control measures:

#### Assessed by a TI Laser Safety Officer or designated laser safety person to determine necessary controls;

#### Engineering controls shall be the primary means to control exposures below the maximum permissible exposure (MPE);

#### Administrative controls (e.g. training, procedures, signage) may be used as secondary means to prevent risk of exposures when engineering controls alone are inadequate or impractical.

### Appropriate personal protective equipment (PPE) may be used in conjunction with engineering and other administrative controls, but shall not be used as the primary protection method.

#### Laser protective eyewear shall be marked with the laser protective wavelength and its associated optical density.

#### Laser protective eyewear shall be visually inspected and documented annually and also inspected prior to each

## Medical Surveillance

### Provisions for a medical surveillance baseline and appropriate records maintenance for individuals assigned laser-related work when potentially exposed to open-beam Class 3B (IIIb) or Class 4 (IV) laser radiation;

#### The site medical consultant shall determine the appropriate exam protocols for medical surveillance. (Note: ANSI Z136.1 provides guidance.)

#### Laser eye examinations shall be required initially (prior to beginning laser-related work as described 5.4.1)), at end of laser related work and following a suspected exposure to open beam Class 3B (IIIb) or Class 4 (IV) laser radiation.

### Sites shall maintain a list of employees included in the medical surveillance program document the reasons for placing the individuals into the surveillance program.

### If there is suspected exposure to an open beam Class 3B (IIIb) or Class 4 (IV) laser radiation the sites shall notify the local occupation health personnel, the WWESH Medical Surveillance Program Administrator and the TI Medical Director.  Notification shall be made to [medicalsurveillance@list.ti.com](mailto:medicalsurveillance@list.ti.com) within 2 working days of the incident.

## Design and Manufacture or Modification of Laser Products

### Sites that engage in the business of laser manufacture (or modification) shall provide for:

### Laser products designed to meet the lowest classification reasonably achievable that can perform the intended function;

### Laser products (or modification of existing tools) should be reviewed by a TI Laser Safety Officer (LSO) or designated laser safety person to determine compliance to applicable requirements;

### Laser products classified and labeled according to the requirements of the IEC standard;

### Maintenance of certification and testing records and reports for each laser product (manufactured or modified);

Note: Records and reports that demonstrate compliance with the regulations of the country of use or the appropriate standard (e.g., in the United States, Food and Drug Administration (FDA) regulations, 21, Code of Federal Regulations (CFR) Sub-Chapter J, apply).

## Training/Qualifications

### Site ESH representative or designated laser safety person referenced in this Standard shall meet the education, training and competency requirements as mandated by local country requirements. In the absence of local requirements, the individual shall have a basic understanding of fundamentals of laser safety including the hazards of laser radiation and how to apply controls to prevent exposure.

### Site shall provide for laser safety training, as appropriate for the accessible laser hazards:

#### Individuals assigned laser–related work shall receive initial training regarding the safe operation of lasers, potential hazards, control methods and the selection and use of personal protective equipment before being allowed to perform such laser-related work;

#### Individuals operating a laser product, but not assigned laser-related work shall receive initial training appropriate for the laser product classification and the accessible laser hazards.

# standard Approval

This standard has been approved by Zane Broadhead, TI Vice President.

# Revision history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Rev#** | **Date** | **Nature of Revision** | **Author/Editor** | **Approver** |
| A | 04/17/2006 | Periodic content review and minor editorial changes. | D. Moore | Brenda Harrison |
| B | 02/12/2007 | Definitions preface in 5.0 modified to accommodate the transition to the Glossary of Terms. | J. Willis | N/A |
| C | 05/22/2013 | Removed requirements for a written program and transferred “Laser Safety Officer” responsibilities to ESH team or “designated laser safety person.” | P. Schwab | ELC |
| D | 06/18/2014 | Added training/qualification requirements for to site ESH or “designated laser safety person” responsible for supporting this program. | P. Schwab | David Thomas |
| E | 04/01/2020 | Modified 5.3 to include exemption for low risk situations  Minor updates: removal of unneeded references, prohibitting personal laser products, meeting local requirements, ensuring TI designed/ modified products are reviewed by LSO.  Added requirement to alert Medical Surveillance Admin/Medical Director if eye exposure requires examination | M. Jones  D. Moore |  |