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American National Standard

*American National Standard
for Safe Use of Lasers
in Educational Institutions*



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Z136.5 – 2020
Revision of
ANSI Z136.5-2009

**American National Standard
for Safe Use of Lasers
in Educational Institutions**

Secretariat

Laser Institute of America

Approved May 19, 2020

American National Standards Institute, Inc.

**American
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Foreword (This introduction is not a normative part of ANSI Z136.5-2020, *American National Standard for Safe Use of Lasers in Educational Institutions.*)

In 1968, the American National Standards Institute (ANSI) approved the initiation of the Safe Use of Lasers Standards Project under the sponsorship of the Telephone Group.

Prior to 1985, Z136 standards were developed by ANSI Committee Z136 and submitted for approval and issuance as ANSI Z136 standards. Since 1985, Z136 standards are developed by the ANSI Accredited Standards Committee (ASC) Z136 for Safe Use of Lasers. A copy of the procedures for development of these standards can be obtained from the secretariat, Laser Institute of America, 13501 Ingenuity Drive, Suite 128, Orlando, FL 32826 or viewed at www.z136.org.

The present scope of ASC Z136 is to protect against hazards associated with the use of lasers and optically radiating diodes.

ASC Z136 is responsible for the development and maintenance of this standard. In addition to the consensus body, ASC Z136 is composed of standards subcommittees (SSC) and technical subcommittees (TSC) involved in Z136 standards development and an editorial working group (EWG). At the time of this printing, the following standards and technical subcommittees were active:

SSC-1	Safe Use of Lasers (parent document)
SSC-2	Safe Use of Lasers and LEDs in Telecommunications Applications
SSC-3	Safe Use of Lasers in Health Care
SSC-4	Measurements and Instrumentation
SSC-5	Safe Use of Lasers in Educational Institutions
SSC-6	Safe Use of Lasers Outdoors
SSC-7	Eyewear and Protective Barriers
SSC-8	Safe Use of Lasers in Research, Development, and Testing
SSC-9	Safe Use of Lasers in Manufacturing Environments
SSC-10	Safe Use of Lasers in Entertainment, Displays, and Exhibitions
TSC-1	Biological Effects and Medical Surveillance
TSC-2	Hazard Evaluation and Classification
TSC-4	Control Measures, Training, and Laser Safety Programs
TSC-5	Non-Beam Hazards
TSC-7	Analysis and Applications
EWG	Editorial Working Group

The seven standards currently issued are:

ANSI Z136.1-2014, *American National Standard for Safe Use of Lasers*

ANSI Z136.2-2012, *American National Standard for Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources*

ANSI Z136.3-2018, *American National Standard for Safe Use of Lasers in Health Care*

ANSI Z136.5-2020, *American National Standard for Safe Use of Lasers in Educational Institutions*

ANSI Z136.6-2015, *American National Standard for Safe Use of Lasers Outdoors*

ANSI Z136.8-2012, *American National Standard for Safe Use of Lasers in Research, Development, or Testing*

ANSI Z136.9-2013, *American National Standard for Safe Use of Lasers in Manufacturing Environments*

This American National Standard provides guidance for the safe use of lasers and laser systems in educational institutions. The provisions of this standard are applicable to educational facilities ranging from grade school through college and university. In general, the methodology used in this standard is based upon procedures previously established in ANSI Z136.1. General procedures have been adapted for the unique environment of educational institutions. Engineering and administrative control measures appropriate for typical educational activities associated with lasers are supplied to assist users in establishing a sound laser safety program in the educational environment.

This standard has been published as part of the ANSI Z136 series of laser safety standards. The basic document is the ANSI Z136.1, *American National Standard for Safe Use of Lasers*. For the most part, this standard may be used independently of ANSI Z136.1; however, the user should be familiar with and have access to ANSI Z136.1. Instances where additional guidance contained in ANSI Z136.1 is required are noted in this document.

It is expected that this standard will be periodically revised as new information and experience in the use of lasers is gained. Future revisions may have modified methodology, and use of the most current document is highly recommended.

While there is considerable compatibility among existing laser safety standards, some requirements differ among state, federal, and international standards and regulations. These differences may have an effect on the particulars of the applicable control measures.

Occasionally, questions may arise regarding the meaning or intent of portions of this standard as it relates to specific applications. When the need for an interpretation is brought to the attention of the secretariat, the secretariat will initiate action to prepare an appropriate response. Since ANSI-approved Z136 standards represent a consensus of concerned interests, it is important to ensure that any interpretation has also received formal consideration. Requests for interpretations and suggestions for improvements of the standard are welcome. They should be sent to ASC Z136 Secretariat, Laser Institute of America, 13501 Ingenuity Drive, Suite 128, Orlando, FL 32826.

This standard was developed by Standards Subcommittee 5 (SSC-5) "Safe Use of Lasers in Educational Institutions" and approved by ASC Z136. Committee approval of the standard does not necessarily imply that all members voted for its approval.

Sheldon Zimmerman, Committee Chair
C.D. Clark III, Committee Vice-Chair
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Z136 standards and recommended practices are developed through a consensus standards development process approved by the American National Standards Institute. The process brings together volunteers representing varied viewpoints and interests to achieve consensus on laser safety related issues. As Accredited Standards Developer (ASD) and secretariat to ASC Z136, the Laser Institute of America (LIA) administers the process and provides financial and clerical support to the committee.

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American National Standard for Safe Use of Lasers in Educational Institutions

1. General

1.1 Scope.

This standard addresses laser safety concerns and situations that may occur in educational environments. This standard is not a substitute for ANSI Z136.1 (latest revision)¹ that is required for a full understanding of laser safety officer (LSO) duties and laser hazard evaluation. Environments characteristic of educational institutions, wherein lasers may be found, include teaching laboratories, classrooms, lecture halls, science fairs, museums, and student projects on-and-off campus. This standard is intended for faculty and students using lasers at primary, secondary, and college levels of education excluding graduate level research laboratories that are more comprehensively addressed by ANSI Z136.8 (latest revision) and Z136.1 (latest revision). The wavelength range of interest includes the ultraviolet (UV), visible, and infrared (IR) regions of the electromagnetic spectrum; specifically, the wavelength range from 180 nanometers (nm) to 1 millimeter (mm).

The LSO, or responsible person, for the educational institution shall assess if a specific laser safety standard, ANSI Z136.2, Z136.3, Z136.6, Z136.8 or Z136.9 (latest revisions), is to be consulted for additional safety control measures to complement the laser lesson plan.

1.2 Purpose and Application.

The purpose and application of this standard is to provide reasonable and adequate guidance for the safe use of lasers in educational environments by evaluating and minimizing hazards associated with laser radiation. The hazard evaluation procedure used in this standard is based on Class 1 through Class 4 classification of the laser or laser system that is related to the ability of the laser beam to cause physiological damage to the eye or skin and a fire hazard as an ignition source during intended use. The amount of laser radiation emitted from Class 1 lasers and laser systems is considered to be non-hazardous; Class 4 lasers and laser systems possess the highest potential hazard.

1.2.1 Laser Classification. Laser and laser system hazard potential are generally described using a scheme of Class 1 (inherently safe) through Class 4 (most hazardous). Laser equipment manufacturers are subject to laser product performance standards and regulations that include build safety features and safeguards. Where lasers are deployed such as in a place of work or an educational setting, their safe use is addressed by the applicable consensus standards of Z136 (latest revisions).

¹ When a reference to a standard, regulation or order is followed by a date, e.g., Z136.1-2014, the reference is to that specific document. When a reference to a standard, regulation or order is not followed by a date, e.g., Z136.2, FAA order JO 7400.2, it means the latest revision of that document.