American National Standard

ANSI Z136.4 – 2010

American National Standard Recommended Practice for Laser Safety Measurements for Hazard Evaluation

Laser Institute of America
Laser Applications and Safety

Approved American National Standard
ANSI

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Z136.4 – 2010
Revision of
ANSI Z136.4-2005

American National Standard Recommended Practice for Laser Safety Measurements for Hazard Evaluation

Secretariat
Laser Institute of America

Approved April 22, 2010
American National Standards Institute, Inc.

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American National Standard

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Foreword

(This introduction is not a normative part of ANSI Z136.4-2010, *American National Standard Recommended Practice for Laser Safety Measurements for Hazard Evaluation*.)

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 and Training
TSC-5	Non-Beam Hazards
TSC-7	Analysis and Applications
EWG	Editorial Working Group

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The six standards currently issued are:

ANSI Z136.1-2007, *American National Standard for Safe Use of Lasers* (replaces ANSI Z136.1-2000)

ANSI Z136.3-2005, *American National Standard for Safe Use of Lasers in Health Care Facilities* (replaces ANSI Z136.3-1996)

ANSI Z136.4-2010, *American National Standard Recommended Practice for Laser Safety Measurements for Hazard Evaluation* (replaces ANSI Z136.4-2005)

ANSI Z136.5-2009, *American National Standard for Safe Use of Lasers in Educational Institutions* (replaces ANSI Z136.5-2000)

ANSI Z136.6-2005, *American National Standard for Safe Use of Lasers Outdoors* (replaces ANSI Z136.6-2000)

ANSI Z136.7-2008, *American National Standard for Testing and Labeling of Laser Protective Equipment* (first edition)

This American National Standard Recommended Practice provides guidance for optical measurements associated with laser safety requirements. The information provided in this recommended practice is intended to assist users who are entrusted with the responsibility of conducting laser hazard evaluations to ensure that appropriate control measures are implemented. Laser safety requirements and the rationale for them are specified in ANSI Z316.1 *American National Standard for Safe Use of Lasers*. The procedures and methodologies described in this recommended practice are based on requirements previously established in ANSI Z136.1. As the name implies, this recommended practice contains recommendations that will lead to the desired end result. On many occasions, there is more than one measurement approach to achieve the end result, and the recommended measurement techniques in this recommended practice should be viewed as plausible practical options, and not necessarily as the exclusive techniques to perform a given task.

This recommended practice 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*. In general, this recommended practice may be used as a supplement to ANSI Z136.1 when additional details on laser safety measurements are desired.

This standard is expected to 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.

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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 Z136 standards represent a consensus of concerned interests, it is important to ensure that any interpretation has also received the concurrence of a balance of interests. For this reason, the secretariat is not able to provide an instant response to interpretation requests except in those cases where the matter has previously 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 processed and approved for submittal to ANSI by ASC Z136. Committee approval of the standard does not necessarily imply that all members voted for its approval.

Ron Petersen, Committee Chair
Sheldon Zimmerman, Committee Vice-Chair
Robert Thomas, Committee Secretary

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Notice

(This notice is not a normative part of ANSI Z136.4-2010, *American National Standard Recommended Practice for Laser Safety Measurements for Hazard Evaluation*.)

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 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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Participants At the time it approved this standard, ASC Z136 had the following members:

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Academy of Laser Dentistry	Joel White
Altos Photonics, Inc.	Lucian Hand
American Academy of Dermatology	Mark Nestor
American College of Obstetricians & Gynecologists	Ira Horowitz
American Dental Association	Joel White
American Glaucoma Society	Michael Berlin
American Industrial Hygiene Association	R. Timothy Hitchcock
American Society for Laser Medicine & Surgery	David Sliney Jerome Garden (Alt)
American Society of Safety Engineers	Thomas V. Fleming Walter Nickens (Alt)
American Veterinary Medical Association	Kenneth Bartels
American Welding Society	Mark McLear
Association of periOperative Registered Nurses	Evangeline Dennis
Buffalo Filter	Daniel Palmerton
Camden County College	Fred Seeber
Corning, Inc.	C. Eugene Moss
Delphi Corporation	Paul Daniel Jr.
Health Physics Society	Thomas Johnson David Sliney (Alt)
High-Rez Diagnostics, Inc.	Richard Hughes
Institute of Electrical and Electronics Engineers, Inc. (SCC-39)	Ron Petersen
International Imaging Industry Association (I3A)	Joseph Greco
Kentek Corporation	William Arthur
L*A*I International	Thomas Lieb
Laser Institute of America	Gus Anibarro
Laser Safety Consulting, LLC.	Darrell Seeley
LASERVISION USA	Richard Greene
LFI International	Roberta McHatton
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Lawrence Livermore National Laboratory	Robert Ehrlich
Los Alamos National Laboratory	Connon Odom
National Aeronautics and Space Administration	Guy Camomilli Randall Scott (Alt)
National Institute of Standards and Technology (NIST)	Shao Yang
North American Association for Laser Therapy (NAALT)	Raymond Lanzafame

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Organization Represented	*Name of Representative*
Power Technology, Inc.	William Burgess
Rockwell Laser Industries	William Ertle
Underwriters Laboratories, Inc.	Peter Boden
	David Dubiel (Alt)
University of Texas, Southwestern Medical Center	John Hoopman
US Department of Health and Human Services, Center for Devices and Radiological Health	Richard Felten
US Department of Labor, Occupational Safety & Health Administration	Jeffrey Lodwick
US Department of the Air Force, Air Force Research Laboratory	Benjamin Rockwell
	Robert Thomas (Alt)
US Department of the Air Force, Surgeon General's Office	Scott Braley
US Department of the Army, Medical Research & Materiel Command	Bruce Stuck
US Department of the Army, US Army CHPPM	Jeffrey Pfoutz
	Penelope Galoff (Alt)
US Department of the Navy, Naval Air Systems Command	James Sheehy
US Department of the Navy, Naval Sea Systems Command	Sheldon Zimmerman
	Mary Zimmerman (Alt)
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