ANSI Z359 Fall Protection Code

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This document provides a brief history of the original U.S. fall protection consensus standard, ANSI Z359.1, and recent developments as it became the ANSI Z359 Fall Protection Code in 2007. It is not intended to list every change but provide an overview of the Committee's work to date. The ANSI Z359 Fall Protection Code can be obtained from the American Society of Safety Engineers under *'Publications'*: http://asse.org

The ANSI Z359 Fall Protection Committee was chartered in 1988 to develop the first consensus standard, ANSI Z359.1 – Safety requirements for personal fall arrest systems, subsystems and components. It was published in 1992 and remained the same until 2007. The Committee began developing additional fall protection standards at the end of the 1990's to continue improving safety for workers at height. At that time, many other countries, including Canada, Australia, and the European Union had separate product standards for each personal fall arrest system component. There were no consensus standards for *users* of fall protection equipment. *A user is a person who performs activities at heights while protected by a personal fall protection system.*

In general, many of the changes to these new <product> standards were driven by improper use of equipment by workers at height. As well, the user standards are designed to educate workers concerning proper use of equipment, and overall safe work strategies and systems.

The ANSI Z359 Fall Protection Code has the following completed (date) or in development (♦):

Z359.0	-2007	Definitions and Nomenclature Used for Fall Protection and Fall Arrest
Z359.1	-2007	Personal Fall Arrest Systems, Subsystems, Components
Z359.2	-2007	Minimum Reqts for a Comprehensive Managed Fall Protection Program
Z359.3	-2007	Positioning and Travel Restraint Systems
Z359.4	-2007	Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
Z359.5	♦	Requirements for Competent Persons
Z359.6	-2009	Specifications and Design Reqts for Active Fall Protection Systems
Z359.7	♦	Certification of Fall Protection Products and Components
Z359.8	♦	Rope Access Systems
Z359.9	♦	Personal Equipment for Protection Against Falls - Descending Devices
Z359.10	♦	Reserved
Z359.11	♦	Full Body Harnesses for Personal Fall Arrest Systems
Z359.12	-2009	Connecting Components for Personal Fall Arrest Systems
Z359.13	-2009	Personal Energy Absorbers and Energy Absorbing Lanyards
Z359.14	♦	Self-Retracting Devices
Z359.15	♦	Vertical Lifelines
Z359.16	♦	Fall Arrestors
Z359.17	♦	Flexible Horizontal Lifeline Systems
Z359.18	♦	Anchorage Connectors

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ANSI Z359.1 sets safety requirements for personal fall arrest systems, subsystems and components for:

- Connectors
- Full Body Harnesses
- Lanyards
- Energy Absorbers
- Anchorage Connectors
- Fall Arresters
- Vertical Lifelines
- Self-Retracting Lanyards

It establishes requirements for:

- Performance
- Design
- Marking
- Qualification
- Instruction
- Training
- Inspection
- Use
- Maintenance
- Removal from service

Sections 6 and 7 are user sections for inspection, maintenance, equipment storage, selection, rigging, use, and training. Although these sections are still in the revised ANSI Z359.1-2007 and the newer product standards, they will eventually be removed as user standards are developed.

As the new product standards are developed for the components above, they will supersede sections detailed in the current ANSI Z359.1

ANSI Z359.1-2007 Key changes from the original standard (ANSI Z359.1-1992 (R1999))

- Connector gate face strength changed from 220 lbs to 3,600 lbs
- Connector gate side strength changed from 350 lbs to 3,600 lbs
- New strength requirements to 3,600 lbs for non-captive eye snap hooks and carabiners
- New marking requirements to distinguish Z359.1-2007 connectors
- New requirements and markings on harnesses with Front D-rings
- Front D-rings can be used in specified fall arrest systems
- Added requirements for double-legged lanyards (2 integrally connected legs)
- Certified anchorages capable of 2 times the maximum arrest force (was 3,600 lbs)

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ANSI Z359.2 establishes guidelines and requirements for an employer's managed fall protection program. This standard is a significant advancement for the safety of workers at height. It is the first user standard in the USA. No other country has a consensus standard specific to a managed fall protection program. The skeleton of the standard was taken from the United States Navy, who is represented on the Committee. Published 2007.

Contents

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ANSI Z359.3 establishes requirements performance, design, marking, qualification, test method, and instructions of lanyards and harnesses compromising personal positioning and travel restraint systems.

Positioning systems allow a worker to be supported on an elevated vertical or inclined surface, such as a wall, and work with both hands free from body support.

Travel restraint systems limit travel so that a worker is not exposed to a fall hazard. Their use is limited to walking/working surfaces with a slope ≤ 18.4 degrees.

Positioning systems and travel restraint systems cannot be used as a primary fall arrest system. Positioning systems must be supplemented with a secondary fall protection system. Unless a body belt is part of a work positioning harness or full body harness, it is not within the scope of this standard. Published 2007.

ANSI Z359.4 establishes requirements for performance, design, marking, qualification, instruction, training, use, maintenance, and removal from service of equipment used in pre-planned assisted-rescue and self-rescue for one or two workers.

The equipment includes connectors, harnesses, lanyards, anchorage connectors, winches/hoists, descent control devices, rope tackle blocks and self-retracting lifelines with integral retrieval capability. Published 2007.

ANSI Z359.5 establishes guidelines for a competent person. IN DEVELOPMENT

ANSI Z359.6 is intended for engineers with expertise in designing fall-protection systems. It specifies requirements for the design and performance of complete active fall-protection systems, including travel-restraint and vertical and horizontal fall-arrest systems. The intention is to provide design criteria for routine use and not to provide specific criteria for infrequently encountered problems which occur. Published 2009.

ANSI Z359.7 establishes requirements for certification of ANSI Z359 Code of fall protection products and components as well as requirements for third-party testing, witness testing and manufacturer self certification of fall protection products and components to the requirements of the ANSI Z359 Code of standards. CURRENTLY UNDER BALLOT

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ANSI Z359.8 The purpose of this document is to provide information and guidance on fall protection practices and procedures for rope access work. It is intended to be used by certified rope access workers working under appropriate supervision using accepted rope access work practices.

IN DEVELOPMENT

ANSI Z359.9 is looking to shadow ISO 22159:2007. This International Standard specifies requirements, test methods, marking and information to be supplied by the manufacturer for descending devices. It also specifies some basic requirements for the descent lines to be used with the descending devices. It is applicable to automatic and manually operated descending devices intended for use in the workplace in access, egress, work positioning and rescue systems. IN DEVELOPMENT

ANSI Z359.10 Reserved

ANSI Z359.11 establishes requirements for the performance, design, marking, qualification, instruction, training, test methods, inspection, use, maintenance and removal from service of Full Body Harnesses (FBH) used for fall arrest, positioning, restraint, suspension and/or rescue applications. IN DEVELOPMENT

ANSI Z359.12 establishes requirements for the performance, design, marking, qualification, test methods and removal from service of connectors. Published 2009.

Key changes from ANSI Z359.1-2007

- Overall this new standard is more performance-based, where as ANSI Z359.1 is a prescriptive standard.
- Test loads were decreased for buckles and adjusters; this aligns with International standards. This can make buckles and adjusters lighter, thus reducing harness weight.
- Dynamic strength testing was added for snaphooks and carabiners.
- Abrasion testing and weather conditioning was added.
- This new standard does not limit materials and processes when manufacturing connectors, thus allowing for future innovation.

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ANSI Z359.13 establishes requirements for the performance, design, marking, qualification, instructions, inspection, maintenance and removal from service of energy absorbing lanyards and personal energy absorbers. Note that horizontal lifelines are outside the scope of this standard. Published 2009.

KEY DEFINITIONS

ENERGY ABSORBER: A component whose primary function is to dissipate energy and limit deceleration forces which the system imposes on the on the body during fall arrest.

PERSONAL ENERGY ABSORBER: An energy absorber which is attached to an harness.

LANYARD: A component consisting of a flexible rope, wire rope, or strap, which typically has a connector at each end for connecting to the body support and to a fall arrester, energy absorber, anchorage connector, or anchorage.

Key changes from ANSI Z359.1-2007

- In general
  - Removed user sections on training and use
  - Caution that users below 130 lbs may experience forces higher than 10Gs.
  - The test weight manufacturers use has been increased
  - More clarity has been provided to manufacturers on some testing qualifications
  - Tighter tolerances are specified on test equipment
  - Additional markings and instructions
- Personal Energy Absorbers (EAP)
  - 2 classifications for Personal Energy Absorbers: 6 ft FF and 12 ft FF (FF: Free Fall) *Section E3.1.1.2 It is recommended that alternative means of fall protection be investigated prior to using systems that allow for free falls greater than 6 feet. Local governing bodies regulate free fall distances and the employer may be required to prove infeasibility before allowing free falls in excess of 6 feet.*
  - Options are provided for terminations based on performance
  - Options are listed for deployment indicators
  - Requirements and testing are provided for 6ft and 12 ft FF EAPs
  - Environmental conditioning tests are required
- Energy Absorbing Lanyards (EAL)
  - Options are provided for terminations based on performance
  - Abrasion testing is required
  - Static tests are required for Wrap-around EALs
  - Dynamic tests are required for Y-Lanyards

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ANSI Z359.14 establishes requirements for performance, design, qualification testing, marking and instructions, inspection, maintenance and storage, and removal from service of self-retracting devices including self-retracting lanyards (SRL's), self-retracting lanyards with integral rescue capability (SRL-R's), and self-retracting lanyards with leading edge capability (SRL-LE's), comprising personal fall arrest or rescue systems. IN DEVELOPMENT

ANSI Z359.15 establishes requirements for the performance, design, marking, qualification, instruction, inspection, use, maintenance and removal from service of vertical lifelines. IN DEVELOPMENT

ANSI Z359.16 establishes requirements for the performance, design, marking, qualification, instruction, training, inspection, use, maintenance and removal from service of fall arrestor components. IN DEVELOPMENT

ANSI Z359.17 establishes requirements related to the design, performance, testing, labeling and provisions for pre-engineered flexible horizontal lifeline systems (FHLS). IN DEVELOPMENT

ANSI Z359.18 establishes requirements for the performance, design, marking, qualification, selection, instructions, inspection, maintenance, and removal from service of anchorage connectors for personal fall protection systems. IN DEVELOPMENT