

STANDARDS UPDATE

ANSI/ASSE Z359.12-2009 Connecting Components for Personal Fall Arrest Systems

INTRODUCTION

The American Society of Safety Engineers (ASSE) has completed work on a new standard devoted to personal fall arrest system connecting component. The new U.S. national standard, ANSI Z359.13-2009, has been published and will take effect November 2009. This Standards Update will summarize new requirements and compare changes which have occurred since the last version of ANSI Z359 Fall Protection Code.

ANSI/ASSE Z359.12-2009 and ANSI/ASSE Z359.1-2007

The previous edition of ANSI Z359 Fall Protection Code, published in 2007, included requirements for connecting components in ANSI/ASSE Z359.1-2007, Personal Fall Arrest Systems, Subsystems and Components standard. The new Z359.12-2009 standard supercedes requirements of previous Z359.1-2007 standard. The fall arrest systems standard has also been updated to ANSI/ASSE Z359.1-2009 in order to reflect the transfer of requirements to new standards in Z359 family of standards.

When new ANSI/ASSE Z359.12-2009 standard takes effect, former requirements in ANSI/ASSE Z359.1-2007 will become obsolete. Equipment meeting the previous standard version can remain in service at the equipment owner's discretion until the equipment's end of useful life. However, new equipment purchases should be made only for products compliant with the fall protection standard's latest version.

Significant Changes in the New Connecting Component Standard

The new standard for connecting components is intended primarily to be followed by fall protection equipment manufacturers. The standard contains detailed design and test requirements for fall protection component hardware used in full-body harnesses and lanyards. Hardware examples covered in the standard are as follows:

- snaphooks
- carabiners
- D-rings, oval rings and O-rings
- buckles
- adjusters

Of hardware described in this standard, only carabiners are typically sold as separate components in fall protection systems. Other hardware items are incorporated as integral elements of the components to which they are attached.

This standard is therefore referenced by other new Z359 product standards, such as ANSI/ASSE Z359.13-2009, Personal Energy Absorbers and Energy Absorbing Lanyard standard.

DESIGN AND TESTING CRITERIA

The new standard's importance to equipment owners and end-users is a higher protection level afforded by specific new connecting hardware design and performance criteria:

- minor axis load tests applied to snaphook and carabiner gates
- dynamic load testing following conditioning for abrasion, UV exposure, and cold temperature exposure

Minor Axis Load Testing

Minor axis load testing is a new requirement applied selectively to snaphooks and carabiners designed without a captive eye feature. The captive eye is the circular ring at one connector end to which a lanyard web or rope thimble is connected. The reason for a minor axis load test addition is to help prevent a failure mode in which the operable gate is loaded by lanyard pressure against the inside of the gate.

Minor axis loading can occur when webbing or rope works its way around the carabiner body so that fall forces are directed against the gate, pushing it out and away from the connector body. This is the weakest loading orientation for some carabiner and snaphook designs. The minor axis load test helps to ensure that potential gate disengagement will not occur when the connector is subjected to the worst anticipated loading configuration. Note that carabiners and snaphooks which are constructed with a circular eye are not susceptible to minor axis loads against the gate mechanism.

Dynamic Load Testing

Dynamic load testing is another new connector standard test requirement. Standards writers believe it is possible to reveal design deficiencies in connectors not otherwise observed in static testing by subjecting hardware to dynamic loads, duplicating impact forces occurring in an accidental fall. Prior to dynamic testing, hardware is first subjected to a series of conditioning tests. These tests are intended to further simulate environments encountered in actual use and include exposure to abrasion, ultra-violet light, and cold temperature prior to dynamic testing.

Minimum Breaking Strength and Corrosion Resistance

As in the standard previous version, connector hardware is tested for static strength to 5,000 lbs. and for corrosion resistance by prolonged salt spray exposure. Carabiners, snaphooks, D-rings, and O-rings must also be subjected

to proof load testing (a strength test applied to each piece of hardware) to 3,600 lbs.

MARKINGS AND INSTRUCTIONS

Connector hardware such as carabiners, which are sold as separate components, will bear new standard compliance marking. Connectors are also permanently marked with major axis strength, indicated by marking **22K** or **5,000 lbs**. For connectors with operable gates, gates are stamped or permanently marked with load rating **16K** or **3600 lbs**.

Instructions are provided by hardware manufacturers and may be included with user instructions of components to which connectors are attached, or may be provided separately as individual carabiners. Instructions provide hardware construction and strength information and also include compatibility and proper use guidance.

CONCLUSION

The new ANSI/ASSE Z359.12-2009 standard for connectors advances performance and reliability of fall protection system connecting components. Manufacturers will be required to incorporate these requirements in products which are sold as individual components, e.g. carabiners, immediately upon standard effective date. New requirements must also be incorporated into energy-absorbing lanyard connector hardware upon the effective date of new Z359.13-2009 standard.