

The OSHA guidelines for head protection are referenced in sections 1910.135 (general industry), 1926.100 (construction) and 437-007 (forestry).

Occupational Head Protection

Each affected employee shall wear protective helmets when working in areas where there is a potential for injury to the head from falling objects. Protective helmets designed to reduce electrical shock hazard shall be worn by each such affected employee when near exposed electrical conductors which could contact the head.

Although the OSHA standards themselves do not identify specific occupations or applications where head protection is required, there are some examples:

Some examples of occupations for which head protection should be routinely considered are: carpenters, electricians, linemen, mechanics and repairers, plumbers and pipe fitters, assemblers, packers, wrappers, sawyers, welders, laborers, freight handlers, timber cutting and logging, stock handlers, and warehouse laborers."

The appendix also provides examples of general applications where head protection should be worn.

Helmets must comply with the performance guidelines in the ANSI Z89.1-1986, American National Standard for Personal Protection—Protective Headwear for Industrial Workers Requirements.

ANSI Z89.1-1986

ANSI Z89.1-1986 separates protective helmets into different types and classes.

The standard identifies Type 1 and Type 2 helmets. Type 1 helmets incorporate a full brim (the brim fully encircles the dome of the hat); Type 2 helmets have no encircling brim, but may include a short bill on the front (similar to a baseball cap).

In terms of electrical performance, ANSI Z89.1-1986 recognizes three classes:

- **Class A Helmets** are intended to reduce the force of impact of falling objects and to reduce the danger of contact with exposed low-voltage electrical conductors. For certification, sample shells are proof-tested at 2,200 volts of electrical charge.
- **Class B Helmets** are intended to reduce the force of impact of falling objects and to reduce the danger of contact with exposed high-voltage electrical conductors. Sample shells are proof-tested at 20,000 volts.
- **Class C Helmets** are intended to reduce the force of impact of falling objects, but offer no electrical protection.

Note: The voltages stated in Classes A and B are not intended to be an indication of the voltage at which the headgear protects the wearer.

In addition to electrical protection, hard hats are also tested for impact and penetration resistance from blows to the top of the head, flammability resistance, and water absorption. The rigorous testing requirements are described in detail within the standard.

Every hard hat conforming to the requirements of ANSI Z89.1-1986 must be appropriately marked to verify its compliance. The following information must be marked inside the hat:

- The manufacturer's name
- The legend, "ANSI Z89.1-1986"
- The class designation (A, B or C)

ANSI Z89.1-1997

In 1997 ANSI published a revision to its Z89.1 head protection standard. ANSI Z89.1 contains some notable changes.

The revision eliminated the old Type 1 and Type 2 design designations. In the revised standard, "Type" is used to designate whether a helmet provides protection strictly from blows to the top of the head (Type I) or protection from blows to both the top and sides of the head (Type II).

In addition, Z89.1-1997 also changed the alpha designations for the classes of electrical performance. Under Z89.1-1997, the following three classes are recognized:

- **Class G (General) Helmets**--This is equivalent to the old Class A. Class G helmets are proof tested at 2,200 volts.
- **Class E (Electrical) Helmets**--This is equivalent to the old Class B. Class E helmets are proof tested at 20,000 volts.
- **Class C (Conductive) Helmets**--This class provides no electrical insulation; the alpha designation did not change from the old standard.

Hard hats must also contain user information under the 1997 standard. In addition to the manufacturer's name, ANSI legend and class designation, Z89.1-1997 compliant helmets must be marked with the date of manufacture. Instructions pertaining to sizing, care and service life guidelines must also accompany the hard hat.


ANSI Z89.1-2003

ANSI also published a revision to the Z89.1-1997 standard in 2003. The most significant changes from the 1997 version were made to harmonize with other national standards that test and evaluate equipment performance. In addition, many physical requirements for helmet components that do not provide added user value or that limited design or performance had been removed.

ANSI Z89.1-2009

ANSI published a revision in January of 2009. The significant changes from the 2003 version are three non-mandatory tests and are easy to understand. Each of these tests if elected to be tested by the manufacturer will display three new markings on the helmet.

The three optional test criteria are:

Reverse Donning: Helmets marked with a "reverse donning arrow"  can be worn frontward or backward in accordance with the manufacturer's wearing instructions. They pass all testing requirements, whether worn frontward or backward.

Lower Temperature: Helmets marked with a "LT" indicates that the hard hat meets all testing requirements of the standard when preconditioned at a temperature of -30°C (-22°F).

High Visibility: Helmets marked with a "HV" indicates that the hard hat meets all testing requirements of the standard for high visibility colors. This includes tests for chromaticity and luminescence.

Service Life

One common misconception is that hard hats have a predetermined service life - that is not the case. Both the 1986 and 1997 ANSI standards address service life under maintenance and care of the hard hat. All hard hat components should be inspected daily for signs of dents, cracks, penetration and any damage due to impact, rough treatment, or wear. Although it is not considered a "shelf life", some hard hats do have "Useful Service Life Guidelines". These guidelines suggest replacing the suspension every 12 months and the hard hat after 5 years of use. Any hard hat that fails the visual inspection should be removed from service until the problem is corrected.

In addition to everyday wear and tear, ultraviolet (UV) radiation can pose a problem for hats constructed of plastic materials. Damage caused by UV radiation is easy to spot: the hat will lose its glossy finish and eventually take on a chalky appearance. Further degradation could cause the shell to actually start flaking away. Once the effects of UV radiation are detected, the hard hat shell should be immediately replaced.

Commonly Asked Questions


Q. Can I put decals on my hard hat?

A. In most instances, yes.

Q. Can hard hats be painted?

A. ANSI Z89.1-2003 Appendix A4 states that caution should be exercised when painting hard hat shells since some paints and thinners may attack and damage the shell and reduce protection levels. The hard hat manufacturer should be consulted before painting.

Q. Can I wear my hard hat backward?

A. Most likely. Check the helmet for the "reverse donning arrow"  marking. The current 2009 edition addresses the issues of reverse wearing of hard hats. The standard now provides a non-mandatory test protocol that will allow manufacturers of hard hats to test the helmet and be marked with the "reverse donning arrow". This means the helmet can be worn frontward or backward **in accordance with the manufacturer's wearing instructions.**