

The Care and Feeding of a Head Protection System

How Hard Hats Protect You

Hard hats protect you by providing the following features:

- A rigid shell that resists and deflects blows to the head.
- A suspension system inside the hat that acts as a shock absorber.
- Some hats serve as an insulator against electrical shocks.
- Shields your scalp, face, neck, and shoulders against splashes, spills, and drips.

Some hard hats can be modified so you can add face shields, goggles, hoods, or hearing protection to them

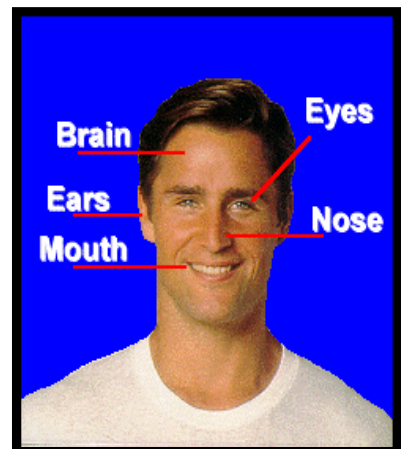


Why Head Protection is Important

Your head is a very delicate part of your body.

In and around your head are:

| | | |
|--------------|--|--------------|
| ▪ Your Eyes | | ▪ Your Ears |
| ▪ Your Nose | | ▪ Your Mouth |
| ▪ Your Brain | | |



Injuries to the head are usually very serious so use your Head and wear your hard hat. It might just save your life today...

HEAD PROTECTION SURVEY

A survey by the Bureau of Labor Statistics (BLS) of accidents and injuries noted that most workers who suffered impact injuries to the head were not wearing head protection. The majority of workers were injured while performing their normal jobs at their regular worksites.

The survey showed that in most instances where head injuries occurred employers had not required their employees to wear head protection. Of those workers wearing hard hats, all but five percent indicated that they were required by their employers to wear them. It was found that the vast majority of those who wore hard hats all or most of the time at work believed that hard hats were practical for their jobs. According to the report, In almost half of the accidents involving head injuries, employees knew of no actions taken by employers to prevent such injuries from recurring.

The Bureau of Labor Statistics (BLS) survey noted that more than one-half of the workers were struck on the head while they were looking down and almost three-tenths were looking straight ahead.

A third of the unprotected workers were injured when bumping into stationary objects, such actions injured only one-eighth of hard hat wearers.

Elimination or control of a hazard leading to an accident should, of course, be given first consideration, but many accident-causing head injuries are of a type difficult to anticipate and control. Where these conditions exist, **Head protection must be worn to eliminate injury!**

Under the Occupational Health and Safety Act, 1983:

- Employers have a "Duty of Care" to ensure the health, safety and welfare at work of employees and others.
- Employers must take all practicable measures to control risks against injuries in the workplace.
- Employees have an obligation to co-operate with their employers on health and safety matters. Failing to comply with the "Duty of Care" provisions of the Act is an offence.

Duty of Care

- There is a legal requirement for industry to be responsible for managing - workplace health and safety.
- This requirement, expressed as the "Duty of Care" principle, is the basis of the Occupational Health and Safety Act, 1983. Implementing the Duty of Care principle means planning for prevention of workplace accidents, injuries and illness.

Responsibilities

- The person in control of conducting hazard assessments should establish the need for safety helmets to be worn on construction sites.

1. Employers are responsible for ensuring that a safety helmet is worn on a construction site where:

- There is a possibility that a person may be struck on the head by a falling object.
- A person may strike their head against a fixed or protruding object.
- Accidental head contact may be made with electrical hazards.

2. Every person on a construction site should wear a safety helmet:

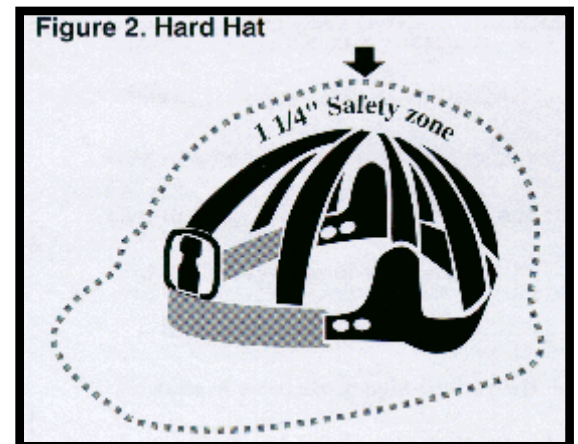
- Where there is a risk of a head injury.
- If required to do so by an employer and/or the person in control of the workplace.

NOTE: It is Compulsory to Wear a Safety Helmet When Carrying Out Demolition Work. Construction Safety Regulation 84(32).

All safety helmets worn on construction (mining) sites should conform with the requirements of AS1801 - Industrial Safety Helmets and be maintained in accordance with AS1800 - The Selection, Care and Use of Industrial Safety Helmets

Hard hats require a hard outer shell and a shock-absorbing lining. The lining should incorporate a head band and straps that suspend the shell from 1 to 1 1/4 inches (2.54 cm to 3.18 cm) away from the user's head. This design provides shock absorption during impact and ventilation during wear.

As with devices designed to protect eyes, the design, construction, testing, and use of protective helmets must meet standards established by ANSI. Protective helmets purchased after July 5, 1994, must comply with ANSI Z89.1-1986,(7) whereas, those purchased before this date must meet the ANSI Z89.1-1969 standard.



What types of head protection are available?

Hard hats are divided into three industrial classes:

Class A. These helmets are for general service. They provide good impact protection but limited voltage protection. They are used mainly in mining, building construction, shipbuilding, lumbering, and manufacturing.

Class B. Choose Class B helmets if your employees are engaged in electrical work. They protect against falling objects and high-voltage shock and burns.

Class C. Designed for comfort, these light-weight helmets offer limited protection. They protect workers from bumping against fixed objects but do not protect against falling objects or electric shock. Look at the inside of any protective helmet you are considering for your employees, and you should see a label showing the manufacturer's name, the ANSI standard it meets, and its class. Figure 2 shows the basic design of hard hats.

How do I choose the correct protective helmets from among the different types?

Each kind of protective helmet is designed to protect against specific hazards. By completing the hazard assessment outlined above, you will identify the specific workplace hazards that pose a threat to your employee's head.

I have purchased new hard hats that meet the ANSI requirements. Have I fulfilled my responsibility to protect my employees' heads?

No. Issuing appropriate head protection to employees is a major first step, but you must make sure that the hard hats continue to provide sufficient protection to your employees. Do this by training your employees in the proper use and maintenance of hard hats including daily inspection of them. If your employees identify any of the following defects, remove the hard hats from service:

The suspension system shows signs of deterioration such as:

- Cracking
- Tearing
- Fraying

The suspension system no longer holds the shell from 1 inch to 1 1/4 inches (2.54cm - 3.18cm) away from the employee's head. The brim or shell is cracked, perforated, or deformed. The brim or shell shows signs of exposure to heat, chemicals, ultraviolet light, or other radiation. Such signs include:

- Loss of surface gloss
- Chalking
- Flaking (a sign of advanced deterioration)

Could employees wearing hard hats and working at elevations create a potential hazard for the employees working below?

To protect employees working below, you must provide chin straps for the protective helmets worn by employees working at higher elevations, whether in an aerial lift or at the edge of a pit. The chin straps should be designed to prevent the hard hats from being bumped off the employees' heads.

Can I require employees to cut their hair if it is long enough to get tangled in machinery?

Long hair (longer than four inches) can be drawn into machine parts such as chains, belts, rotating devices, suction devices, and blowers. Hair may even be drawn into machines otherwise guarded with mesh. Although you need not require your employees to cut their hair, you must require them to cover and protect their hair with bandanas, hair nets, turbans, soft caps, or the like. These items, however, must not interfere with the suspension of the hard hat.

Once I have selected helmets to protect my employees' heads, how do I make sure they use them properly?

- You must train your employees to maintain and care for the head protection. Your training communicates the importance of wearing head protection and taking proper care of it. Important information you will want to consider when training employees on how to care for their hard hats includes the following:
 - Paints, paint thinners, and some cleaning agents can weaken the shell of the hard hat and may eliminate electrical resistance. Consult the helmet manufacturer for information on the effects of paint and cleaning materials on their hard hats. Keep in mind that paint and stickers can also hide signs of deterioration in the hard hat shell. Limit their use.
 - Ultraviolet light and extreme heat, such as that generated by sunlight, can reduce the strength of the hard hats. Therefore, employees should not store or transport hard hats on the rear-window shelves of automobiles or otherwise in direct sunlight.

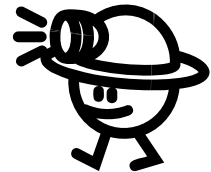
Also, instruct employees to clean the protective helmets periodically by:

- Immersing for one minute in hot (approximately 140o F, or 60o C) water and detergent,
- Scrubbing, and Rinsing in clear hot water.

Train Employees to Know...



- The Necessity of Proper Head Protection – IE Workplace Hazards
- How the Head Protection System will Protect them
- The Limitations of the Head Protection System
- When & Where must the Head Protection System be worn
- How to where the Head Protection System properly
- How to adjust the Head Protection System for maximum comfort & protection
- Recognize Frayed, damaged, deteriorated, cracked or expired suspension systems
- Recognize deformed, cracked, perforated or expired shell, or brims
- Recognize Chalking, or loss of surface gloss on shell, or brims
- Proper Cleaning & Disinfecting Procedures





The 2003 revisions to three American National Standards Institute (ANSI) standards affect protective equipment and techniques used by millions of workers and safety professionals, as well as the manufacturers and testers of that equipment. While only the actual ANSI standards that cover Eye and Face Protection, Head Protection, and Confined Space safety should be followed, these highlights and summaries should help workers, safety officers, and employers understand the changes that concern you.

Scope of Z89.1 - 2003

American National Standard for Head Protection The new standard was approved in July 2003 and continues to cover requirements for two types of impact-resistant helmets:

1. TYPE I (Top Impact)
Helmets intended to reduce the force of an impact to the top of a wearer's head.
2. TYPE II (Top and Lateral Impact)
Helmets intended to reduce the force of an impact resulting from a blow-received off-center or to the top of a wearer's head.

The new standard's performance requirements for Type I and Type II Helmets are equivalent to those specified in the 1998 revision.

Electrical Performance

1. CLASS E (Electrical)
Helmets intended to reduce the danger of exposure to high-voltage electrical conductors, proof-tested at 20,000 volts.
2. CLASS G (General)
Helmets intended to reduce the danger of exposure to low-voltage electrical conductors, proof-tested at 2,200 volts.
3. CLASS C (Conductive)
Helmets not intended to provide protection from electrical conductors. The electrical performance requirements in the new 2003 standard are identical to those in the 1997 standard.

Revisions to Z89.1 - 2003

Helmets that provide some degree of top and off-center protection were addressed in ANSI Z89.1-1997 with the introduction of Type I and Type II helmets. In comparison, most revisions to Z89.1-2003 are minor editorial changes. For example, the description of the test headform was moved from "9.3.2 Apparatus" to "9.3.3 Mounting."

The new standard recognizes advances in material and technology. Physical requirements that did not add value or "limited design or performance" were removed, shifting the standard's emphasis to performance.

Type I (Top Impact Protection)

V-Gard® Hats and Caps

- Popular styling, lightweight.
- Meet Class E and Class G electrical performance requirements.

Advance™ Caps

- Vented for improved cooling.
- Non-vented for areas where a Class E Helmet is needed.
- 4- and 6-point suspensions.

Topgard® Hats and Caps

- Uni-ridge design, comfortable fit.
- Meet Class E and Class G electrical performance requirements.

Thermalgard® Caps

- Protect against elevated temperature.
- Meet Class G electrical performance requirements (low-voltage).

Skullgard® Hats and Caps

- Heavy-duty, protect against elevated temperatures.
- Meet Class G electrical performance requirements (low-voltage).

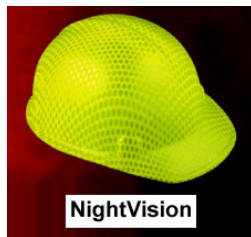
Type II (Top and Lateral Protection)

Vanguard™ II Helmets

- Fit full range of head sizes.
- Exceed applicable test requirements of ANSI Z89.1 Standard and CSA Z94.1 1992 standard (Canadian lateral protective helmet standard).

Super V®

- Certified to CSA Z94.1 1992 standard (Canadian lateral protective helmet standard) and meets the requirements for a Type I helmet as outlined in ANSI Z89.1 (Class E).





1. **If a protective cap meets ANSI Z89.1 Class E, does it also meet Classes C and G?** - [Top](#)
 Yes. - Updated: *April 30, 2001*

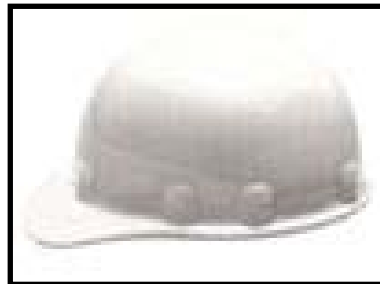
2. **Do your protective caps have an expiration date or a shelf life?** - [Top](#)
 Fibre-Metal head protection meet current ANSI 89.1 standards and can last indefinitely with proper use and care.

Any signs of cracking, gouging or unlimited exposure to environmental factors would justify the replacement of the hardhat.

Similarly, any signs of excessive wear would require replacement of the hardhat suspension. (Generally a suspension should be replaced every two years). - Updated: *May 11, 2001*

3. **Does OSHA allow protective caps to be worn backwards?** - [Top](#)

Contrary to popular belief, OSHA allows protective caps to be worn in the reverse position as long as the manufacturer has the caps tested to current ANSI standards in that position. Wearing a cap in the reverse position is the best way to combine a cap with a welding helmet, face shield or safety mask because it positions the face and eye equipment as close to the face as possible. - Updated: *April 30, 2001*



| 1998 – 2003 Safety Head Protection Upgrades | | |
|---|---|---|
| Requirement | Z89.1 1997 | Z89.1 - 2003 |
| Physical Requirements | Old standard contained 13 entries covering helmet Components like headbands, sweatbands, winter liners, chin and nape straps, etc. | New standard has a single entry for accessories: Accessories installed by the Manufacturer shall not cause the helmet to fail the requirements of this standard. |
| Test Methods | Impact Anvils • Flat impact face • Hemispherical impact face | Impact Anvil • Spherical (formerly called hemispherical) |
| Not Required | Z89.1 - 1997 | Z89.1 - 2003 |
| Hat Sizes | 6V to 8 | 6V to 8V |

Scope of Z87.1 - 2003

The American National Standard Practice for Occupational and Educational Personal Eye Protective Devices ANSI Z87.1-2003 covers the same eye protectors (spectacles, goggles, faceshields, welding helmets, and handshields) as the old standard. However, the new standard has also been expanded to include performance requirements for full-face and loose fitting respirators (for both welding and non-welding applications), many of which are the same as those for spectacle lenses.

Z87.1-2003 covers the description, general requirements, testing, marking, selection, care and use of protectors designed to minimize or prevent eye and face injuries from impacts, and non-ionizing radiation. Protectors covered by this standard are designed for use during machinery operations, welding and cutting, assembly, etc.

Revisions to Z87.1 - 2003

Emphasizing materials instead of performance, the new standard eliminates many physical requirements such as lens thickness. Instead of prescribing how thick a lens must be, the new standard focuses on how well it resists impact or penetration.

The new standard's most significant change is the **introduction of two categories of impact resistance: basic and high**. Under the new standard, protectors offering "basic" impact protection are marked "Z87" while protectors offering "high" impact protection are marked "Z87+." This seems simple enough until you consider that old standard "Z87" and new standard "Z87+" protectors both offer roughly the same "high" impact protection.

To eliminate confusion, the new standard requires the addition of a warning label on new-standard basic impact protectors. To make sure you're using **high impact** protectors, you should look for the "Z87+" mark. **MSA recommends using only "Z87+" high-impact protectors.**

While not in the old standard, the new standard says that **protective components intended for use as part of an assembly** must be tested as an assembly. Also, component packaging must list all other components with which it has been tested.

This means that, to remain in compliance, users may have to replace both visors and faceshield assemblies and/or frames.

About MSA Products Which Are Affected By This Standard:

- With two exceptions (the Wire Screen Basic Visor and Welding Helmet Lenses), MSA's entire line of Face Protectors is marked "Z87+."
- Every permissible combination of MSA component assemblies has passed Z87.1-2003- compliant tests. To differentiate between pre-Z87.1-2003 and current products, we've added a "+" to the name of our Defender faceshield frames and changed their color.

MSA's Face shield Assemblies and Frames for use with Slotted Caps are now labeled "Defender+" and are dark gray instead of black.

Look for the manufacturer's name or mark and "Z87+" to be sure your spectacles comply with Z87.1 - 2003 High Impact performance requirements.

1998 – 2003 Safety Glass Upgrades

| Requirement | Z87.1 - 1989 (R1998) | Z87.1 – 2003 |
|--|---|--|
| Impact Resistance | Single tier of impact resistance | Introduction of two-tiered performance classification system <ul style="list-style-type: none"> • High Impact • Basic Impact |
| Impact Testing | <ol style="list-style-type: none"> 1. High Velocity Impact (1/4" steel ball at 150 fps) 2. High Mass Impact (17.6-ounce pointed projectile dropped from 51.2 inches) 3. Drop Ball Impact (1" steel ball dropped from 50 inches) 4. Plastic Lens Penetration Test (1.56-ounce projectile dropped from 50 inches) | High Impact <ul style="list-style-type: none"> • High Velocity Impact • High Mass Impact • Plastic Lens Penetration Test Basic Impact <ul style="list-style-type: none"> • Drop Ball Impact • Minimum Thickness (3.0 mm) • Plastic Lens Penetration Test |
| Minimum Lens Thickness | 2.0 mm Plano 3.0 mm non-Plano | Lens thickness requirements removed in most cases; reflects standard's emphasis on Performance requirements. Exception: 2.0 mm thickness requirement for Non-Plano lenses to ensure retention in frame remains. |
| High Velocity Impact (1/4" steel ball shot at lens at 15° intervals) | Vertex at corneal front One failure in 20 allowed Improved Sidel Coverage | Vertex 10 mm posterior of corneal front Zero failures in 20 allowed Side coverage extended back 10 mm to provide better coverage of soft tissue area of the orbital |
| Marking | Manufacturer's mark or logo "Z87" | Manufacturer's mark or logo "Z87" Basic Impact User-removable warning tag to indicate Basic Impact protection only; helps differentiate between pre- and post- Z87.1 – 2003 Basic Impact Protectors. "Z87+" High Impact |

Care and Use of MSA V-Gard® Helmets-Frequently Asked Questions and Answers



IT IS IMPORTANT TO REMEMBER TO READ AND FOLLOW CAREFULLY ALL THE INSTRUCTIONS AND WARNINGS ACCOMPANYING YOUR HELMET. FAILURE TO FOLLOW THESE WARNINGS AND THE INSTRUCTIONS ON THE BAG PROVIDED WITH YOUR HELMET CAN RESULT IN SERIOUS INJURY OR DEATH. If you have any questions concerning the care and use of your MSA V-Gard helmet, contact your MSA Sales Associate or MSA Customer Service at 800-MSA-2222.

| QUESTION | ANSWER |
|--|---|
| What is the service life of my V-Gard helmet? | <p>The V-Gard helmet was designed with high quality, wear-resistant materials but it WILL NOT last forever. The protective properties of the helmet WILL be degraded by exposure to many common work environments, such as temperature extremes, chemical exposure, sunlight and normal daily wear and tear. MSA recommends the following replacement schedule:</p> <ul style="list-style-type: none"> • Suspension - replace after NO MORE THAN 12 months; • Entire Helmet - replace after NO MORE THAN 5 years. <p>Remember that these are MAXIMUM useful service life guidelines. Wear or damage noticed during a regular inspection MUST be the determining factor for possible earlier replacement. In any case, ALWAYS replace the helmet after it has withstood impact or penetration.</p> |
| There is a date code on the brim of my V-Gard helmet – is this when the service life starts? | <p>A helmet's service life starts when it is placed in service. This date should be recorded in the helmet, either on the ANSI label or the date of service labels, which are available from MSA customer service. Please note that the "date code" on the brim of your MSA helmet is the date of manufacture, not the starting date for useful service.</p> |
| Can I wear my V-Gard helmet backwards? | <p>Since the suspension attachment points on an MSA V-Gard helmet are the same from front to back, the suspension can be reversed and the cap worn with the brim facing the rear and still meet the requirements of the applicable protective headwear standard (ANSI Z89.1-2003). Also meets CAN/CSA 294.1 2005 with 1-Touch® Fas-Trac suspension. Be sure that the suspension has been reversed so that the nape strap is in the rear.</p> |
| Can I wear a kerchief or bandanna with MSA head Protection? | <p>A kerchief or bandanna should not affect the impact absorption properties of an MSA helmet AS LONG AS it is worn SMOOTHLY on the top of the head. Caution should be taken to avoid bunching up of the material, which could cause pressure points and affect the helmet's ability to work as desired. To assure the best possible fit, a ratchet suspension and/or a chinstrap should be used.</p> |
| Can a baseball cap be worn between a person's head and the suspension of an MSA helmet? | <p>The use of a baseball cap may interfere with the capability of the suspension of our helmets to work properly during an impact. Therefore, it is MSA's recommendation that you should not place a baseball cap between your head and the suspension.</p> |
| How does the color and shape of MSA helmets affect the body temperature of the wearer? | <p>We do not know of any studies relating to the shape or color and heat. Generally darker color helmets absorb more heat than lighter colors, but his can be affected by a variety of environmental conditions.</p> |
| What are the dielectric markings on the V-Gard helmet Label? | <p>There are three ANSI electrical insulation classifications:</p> <ul style="list-style-type: none"> • Class E - Tested to 20,000 volts • Class G - Tested to 2,200 volts • Class C - Not tested (no dielectric protection) |
| Can I paint my MSA V-Gard helmet? | <p>Never paint a V-Gard helmet. Paint may attack and damage the helmet's shell, thereby reducing the degree of protection originally provided.</p> |
| Can I use stickers or tape on MSA V-Gard Helmets? | <p>It is permissible to use pressure-sensitive stickers or tape with self-adhesive backing AS LONG AS THEY ARE NOT closer than 1/2 inch from the edge of the helmet. According to MSA's testing, such stickers or tape in such a location will not affect the burn-through (i.e. dielectric classification) or the structure of an MSA helmet. However, because it is impossible for us to test all pressure-sensitive adhesives, caution should still be taken when making use of such materials. Also, be sure that when these are applied that you are not covering any damage on the helmet.</p> |
| Can I put anything in the space between the V-Gard helmet shell and suspension? | <p>Items such as gloves, cigarettes and earplugs should NEVER be stored between the suspension and the shell. This space is needed when the shell and suspension absorbs the energy of an impact. Such objects in this space can transmit large forces to the head and neck, resulting in serious injury or death.</p> |
| hearing protection manufactured by a company other than MSA? | <p>Use only MSA accessories with the helmet. Modifications or use of other than MSA accessories can reduce the protection levels or dielectric properties designed into the helmet.</p> |