



**#433 Eye and face protective devises:
How ANSI Z87.1-2033 has been
incorporated into OSHA 1910.132**

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Wednesday, March 30, 2011
11:15 a.m. to 12:15 p.m.



**ANSI Z 87.1
OCCUPATIONAL AND EDUCATIONAL
PERSONAL EYE AND FACE
PROTECTION DEVICES**

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- Member ASSE
- Vice Chair ANSI Z87.1
- ASSE representative on ANSI Z87.1

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- Member ASSE
- Prevent Blindness America representative on ANSI Z87.1

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- Why are we here?
- ANSI Z87.1 – 1998R and 2003
Adopted by OSHA, Wednesday 9th, 2009
Federal register page 46350

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How 3 versions differed?

Important differences

- 1989 Angular protection
- 1989 (R-1998) 1989 Republished-no changes
- 2003 Improve impact requirement

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Quick Z87.1 Facts

- 1989 February 2nd, 1989
 - 1989 (1998R) January 4th, 1999
 - 2003 August 19th, 2003
1. ASSE Secretariat of Standard
 2. ASSE did not write the standard
 3. ASSE is not responsible for the content
 4. ANSI is the "accrediting body"
 5. The committee consist of many different organizations, companies and persons
 6. The committee did reach consensus!!!

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Z87.1 Committee make up:

- 5 Government Agencies
- 1 Labor Union
- 4 Technical Societies
- 7 Manufacturer Associations
- 2 General Interest
- 1 Insurance Organization
- 2 Employers
- 2 Utilities
- 3 Liaison to other Committees
- 2 Individual Experts

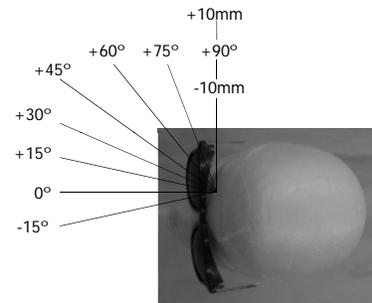
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ANSI Z87.1 1989 and 1989 (1998R)

Important Change
Angular Impact

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High Velocity Test Pattern



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ANSI Z87.1 2003

Strengthen Impact Resistance
Improved Selection Chart

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Hazard Excluded in ANSI Z87.1 Standard

1. Blood borne pathogens
2. Xrays
3. High energy particulate radiation
4. Microwaves
5. Radio frequency radiation
6. Lasers
7. Masers
8. Sports

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6.2.2 Hazard Assessment

- It is necessary to consider certain general guidelines for assessing the eye and face hazard situations that exist in the work environment and to match the protective device to the particular hazard.
- The person directly responsible for a safety program should apply common sense and fundamental technical principles to accomplish these tasks.
- This process is subjective by nature because of the infinite variety of situations where face and eye protection may be required.
- At a minimum, the following recommended hazard assessment procedure should be followed in order to assess the need for eye and face protective equipment.

1910.132(d) Hazard assessment and equipment selection

- **1910.132(d)(1)**
 - The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall:
- **1910.132(d)(1)(i)**
 - Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment;
- **1910.132(d)(1)(ii)**
 - Communicate selection decisions to each affected employee; and,
- **1910.132(d)(1)(iii)**
 - Select PPE that properly fits each affected employee.
- **1910.132(d)(2)**
 - The employer shall verify that the required workplace hazard assessment has been performed through a **written certification** that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.
- Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.

PPE NEEDS ASSESSMENT			
PROJECT: _____			
DATE: _____			
ASSESSMENT CONDUCTED BY: _____			
EYE HAZARDS			
Tasks that can cause eye hazards include:	HAZARD EXAMPLES	YES	NO
1. Working with or near hazardous liquids or materials.	BLOOD/BSPF	<input type="checkbox"/>	<input type="checkbox"/>
2. Sawing, cutting, drilling, sanding, grinding, and other operations that produce airborne dust or flying particles.	CHEMICAL SPLASH	<input type="checkbox"/>	<input type="checkbox"/>
3. Working with or near blood or other body fluids.	DEBRIS	<input type="checkbox"/>	<input type="checkbox"/>
4. Working, cutting, heating or laser operations.	IMPACT	<input type="checkbox"/>	<input type="checkbox"/>
	LIQUID ABRASIONS	<input type="checkbox"/>	<input type="checkbox"/>
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>
FACE HAZARDS			
Tasks that can cause face hazards include:	HAZARD EXAMPLES	YES	NO
1. Working with or near hazardous liquids or materials.	BLOOD/BSPF	<input type="checkbox"/>	<input type="checkbox"/>
2. Sawing, cutting, drilling, sanding, grinding, and other operations that produce airborne dust or flying particles.	CHEMICAL SPLASH	<input type="checkbox"/>	<input type="checkbox"/>
3. Working with or near blood or other body fluids.	DEBRIS	<input type="checkbox"/>	<input type="checkbox"/>
4. Working, cutting, heating or laser operations.	IMPACT	<input type="checkbox"/>	<input type="checkbox"/>
	LIQUID ABRASIONS	<input type="checkbox"/>	<input type="checkbox"/>
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>
HEAD HAZARDS			
Tasks that can cause head hazards include:	HAZARD EXAMPLES	YES	NO
1. Working before other workers who are using tools or other materials which could fall.	BLIND	<input type="checkbox"/>	<input type="checkbox"/>
2. Working on energized electrical equipment.	CHEMICAL EXPOSURE	<input type="checkbox"/>	<input type="checkbox"/>
3. Working with or near hazardous liquids or materials.	ELECTRICAL SHOCK	<input type="checkbox"/>	<input type="checkbox"/>
4. Working under machinery or processes which might cause materials or objects to fall.	IMPACT	<input type="checkbox"/>	<input type="checkbox"/>
5. Working near low hanging objects.	LIQUID ABRASIONS	<input type="checkbox"/>	<input type="checkbox"/>
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>
FOOT HAZARDS			
Tasks that can cause foot hazards include:	HAZARD EXAMPLES	YES	NO
1. Carrying or handling materials that could be dropped.	CHEMICAL EXPOSURE	<input type="checkbox"/>	<input type="checkbox"/>
2. Performing manual material handling.	COMPRESSION	<input type="checkbox"/>	<input type="checkbox"/>
3. Working with or near hazardous liquids or materials.	CUTS OR ABRASIONS	<input type="checkbox"/>	<input type="checkbox"/>
4. Working in areas where heavy objects and/or equipment can roll, fall onto or strike foot.	ELECTRICAL SHOCK	<input type="checkbox"/>	<input type="checkbox"/>
5. Working on energized electrical equipment.	IMPACT	<input type="checkbox"/>	<input type="checkbox"/>
6. Working in areas where objects can strike or cut foot.	PUNCTURE	<input type="checkbox"/>	<input type="checkbox"/>
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>

HAND HAZARDS			
Tasks that can cause hand hazards include:	HAZARD EXAMPLES	YES	NO
1. Handling or coming into contact with sharp objects.	BLOOD (BSPF)	<input type="checkbox"/>	<input type="checkbox"/>
2. Working with or near hazardous liquids or materials.	BLINDS	<input type="checkbox"/>	<input type="checkbox"/>
3. Working with or near hot objects.	CHEMICAL EXPOSURE	<input type="checkbox"/>	<input type="checkbox"/>
4. Working on energized electrical equipment.	CUTS OR ABRASIONS	<input type="checkbox"/>	<input type="checkbox"/>
5. Working with or near blood or other body fluids.	PUNCTURE	<input type="checkbox"/>	<input type="checkbox"/>
6. Working with moving equipment.	OTHER	<input type="checkbox"/>	<input type="checkbox"/>
HEARING HAZARDS			
Tasks that can cause hearing hazards include:	HAZARD EXAMPLES	YES	NO
1. Loud noise from mechanical powered equipment.		<input type="checkbox"/>	<input type="checkbox"/>
2. Loud noise from air powered tools or equipment.		<input type="checkbox"/>	<input type="checkbox"/>
3. Loud noise from the production process.		<input type="checkbox"/>	<input type="checkbox"/>
OTHER PPE NEEDS AND OBSERVATIONS:			

Presentation Note

- | | |
|---|---|
| <p>Z87.1</p> <ul style="list-style-type: none"> • Throughout this part of the presentation, this column will be ANSI Z87-2003 unless otherwise noted. | <p>OSHA</p> <ul style="list-style-type: none"> • Throughout this part of the presentation, this column will be from 29CFR1910.132 (General Requirements), 29CFR1910.133 (Eye and face protection) & 29CFR1910 Subpart I App B unless otherwise noted. |
|---|---|

(1) Survey the Work Area

- | | |
|--|---|
| <p>Z 87</p> <ul style="list-style-type: none"> • Consideration should be given to the six hazard categories addressed by this standard: <ul style="list-style-type: none"> - (a) Impact - (b) Heat - (c) Chemical (Liquid Splash) - (d) Dust - (e) Optical Radiation | <p>OSHA</p> <ul style="list-style-type: none"> • Consideration should be given to the basic hazard categories: <ul style="list-style-type: none"> - (a) Impact - (b) Penetration - (c) Compression (roll-over) - (d) Chemical - (e) Heat - (f) Harmful dust - (g) Light (optical) radiation |
|--|---|

(2) Identify Sources of Hazards

Z 87

- (a) Sources of motion
- (b) Sources of high temperatures
- (c) Types of chemical exposures.
- (d) Sources of dust.

OSHA

- (a) Sources of motion
- (b) Sources of high temperatures
- (c) Types of chemical exposures
- (d) Sources of harmful dust

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(2) Identify Sources of Hazards

Z 87

- (e) Sources of optical radiation
- (f) Layout of workplace and location of other personnel.
- (g) Any electrical hazards.

OSHA

- (e) Sources of light radiation
- (f) Layout of workplace and location of co-workers;
- (g) Any electrical hazards. In addition, injury/accident data should be reviewed to help identify problem areas.

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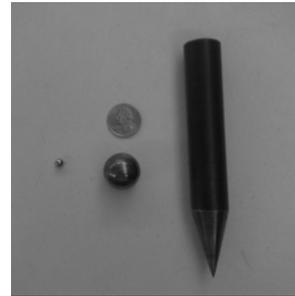


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What is "Basic Impact"?
 How Product tested?
 How do I know if Product "Basic"?

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PROJECTILE SIZE



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"Basic Impact" test by Product Category

Removable spectacle lenses

Clear	1" steel ball	50" height
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Round, removable goggle lenses

Clear & shade 1 thru 3	1" steel ball	50" height
Higher than shade 3	7/8" steel ball	39" height

Rectangular, removable goggle lens

	7/8" steel ball	39" height
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Rectangular, removable welding helmet lens

	5/8" steel ball	39" height
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Removable face shield lens

	1" steel ball	50" height
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What is "High Impact"?
 How Product tested?
 How do I know if Product "High Impact"?

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"High Velocity" test by Product Category

Spectacle plano or nonplano	¼" ball	150 ft/sec
Goggles	¼" ball	250 ft/sec
Face shield	¼" ball	300 ft/sec
Welding helmet	¼" ball	150 ft/sec
Full face respirator	¼" ball	250 ft/sec
Loose fitting respirator	¼" ball	300 ft/sec

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"High Mass" test by Product Category

Spectacle	500 grams pointed projectile	50"
Goggles	500 grams (17.6 onz)	50"
Face shield	500 grams	50"
Welding helmet	500 grams	50"
Full face respirator	500 grams	50"
Loose fitting respirator	500 grams	50"

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PROJECTILE SIZE



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Min. Lens thickness by Product Category

Product	Basic Impact	High Impact	Glass	Plastic
Spectacles Plano	3.0 mm	2.0 mm	Determine by impact test	
Spectacles RX (nonplano)	2.5 mm	2.0 mm	Determine by impact test	
Goggle	3.0 mm	-	-	1.27 mm
Face shield	By material	By material	3.0 mm	1.0 mm
Welding	By material	By material	3.0 mm	1.0 mm
Full face	By material	2.0 mm	Non listed	
Product	By material	2.0 mm	Non listed	

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Product Making

American National Standard Z87.1-2003

Annex G Summary of Marking Requirements Required Marks and Marking Locations by Product Category

Required Marks	Removable Lens(es)	Removable Side Protection	Frame*	Non-Replaceable Components Products
Manufacturer's Mark	ALL	ALL	ALL	ALL
Z87	FS, G, WH	ALL	ALL	ALL
Z87-2			IF APPL	
+ (high impact)	IF APPL			ALL
Shade Number	IF APPL			IF APPL
S (special purpose)	IF APPL			IF APPL
Light/Medium/Dark	FS-IF APPL			FS-IF APPL
V (variable tint photochromic)	IF APPL			IF APPL

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Frame Marking Locations

Category	Frame Components Subject to Markings
Spectacles	Front, at least one temple and removable sideshields
Goggles	Frame and lens housing or carrier
Face shields	Headgear/adaptor and crown
Welding Helmets and Hand shields	Headgear, shell and lens housing or carrier

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Selection Chart

Care shall be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of the hazards must be provided.

Activity and Assessment

● IMPACT

Chipping, grinding, machining, masonry work, melting, and sanding.
Flying fragments, objects, large chips, particles, sand, dirt, etc.

Protector Category and Styles

Spectacles, goggles S, C, D, E, F, G, H, I, J, K, L. For severe exposure add N. Respirators, R, T.
Faceshields shall only be worn over spectacles or goggles.
Faceshields whose vision requires the use of prescription (Rx) lenses shall wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) lenses.
Lenses of contact lenses shall also be required to wear appropriate spectacles or goggles depending on the specific hazard. Dusty and/or chemical environments may represent an additional hazard to contact lens wearers. Wearing of contact lenses under an fit-respirator is permitted.
Goggles, helmets and faceshield assemblies that bear the marking "Z87" comply with the High Impact Test Requirements. Those with "+*" markings comply only with Basic Impact Testing Requirements. Spectacle lenses that are marked with the manufacturer's logo and "+*" sign comply with the High Impact Test Requirements. These spectacle lenses marked with the manufacturer's logo and "+*" comply only with Basic Impact Testing Requirements. It is expected during the selection process to remember that different product categories are tested at different levels of impact resistance. Goggles are tested at a higher level of impact than spectacles and face shields are tested at a higher level than goggles.
The Z87-2 frame marking indicates the frame meets high impact requirements with a minimum lens thickness of 2.0mm.

● HEAT

Furnace operations, pouring, casting, hot dipping, gas cutting, and welding.
Hot sparks

Note: Operations involving heat may also involve optical radiation. (See electric arc, gas, and glare under Optical Radiation below.) Protection from both hazards shall be provided. Faceshields shall only be worn over spectacles or goggles.
Goggles, spectacles: B, C, D, E, F, G, H, I, J, K, L. For severe exposure add N. Respirators R, T.

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The illustrations shown are only representative of protective devices commonly available at this time. Protective devices do not need to take the forms shown, but must meet the requirements of the standard. This guide is not intended to be the sole reference in selecting the proper eye and face protector.

Protective Devices

Limitations	Not Recommended	Protective Devices
<p>Protective devices do not provide unlimited protection.</p> <p>Note: Caution should be exercised in the use of metal frame protective devices in electrical hazard areas. Metal frame protective devices could potentially cause electrical shock and electrical burns through contact with, or thermal burns from exposure to, the hazards of electrical energy, which include radiation from accidental arcs.</p> <p>Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent clearing may be required.</p>	<p>Protectors that do not provide protection from side exposure.</p> <p>Filter or tinted lenses that restrict light transmission, unless it is determined that a glare hazard exists. Refer to OPTICAL RADIATION.</p> <p>Use of face shields alone, without spectacles or goggles.</p>	

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6.2.3 Protector Selection

- After completing a thorough hazard assessment of the environment such as recommended in section 6.2.2, the general procedure for selection of protective equipment is as follows:
 - (1) Become familiar with the Selection Chart (Annex I - Attached at the end of the standard), the types of protective equipment that are available, their capabilities and limitations.
 - (2) Compare the hazards associated with the environment, i.e., impact velocities, masses, projectile shape, radiation intensities, etc., with the available protective equipment.

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6.2.3 Protector Selection

- (3) Make a judgment in selection of the appropriate protective equipment so that the protection is consistent with the reasonably probable hazard.
- (4) Basic impact protectors (lenses) may be used only in an environment where the known or presumed hazards are of low velocity, low mass and low impact nature.
- High impact protectors shall be used in an environment when the known or presumed hazards are of a high velocity, high mass or high impact nature.
- (5) Provide and fit the user with the protective device and provide instruction on its care, use and limitations as recommended in sections 6.2.4 and 6.2.6.

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Product Use and Limitation

6.2.4 Product Use and Limitation

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Product Use and Limitation

6.2.4 Product Use and Limitation

6.2.4.1 Special Purpose Protectors and Lenses

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Product Use and Limitation

6.2.4 Product Use and Limitation

6.2.4.1 Special Purpose Protectors and Lenses

6.2.4.2 Prescription R/X Eyewear

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Product Use and Limitation

- 6.2.4 Product Use and Limitation
- 6.2.4.1 Special Purpose Protectors and Lenses
- 6.2.4.2 Prescription R/X Eyewear
- 6.2.4.3 Filter Lenses and Windows

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Product Use and Limitation

- 6.2.4 Product Use and Limitation
- 6.2.4.1 Special Purpose Protectors and Lenses
- 6.2.4.2 Prescription R/X Eyewear
- 6.2.4.3 Filter Lenses and Windows
- 6.2.4.4 Tinted Lenses and Windows

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Product Use and Limitation

- 6.2.4 Product Use and Limitation
- 6.2.4.1 Special Purpose Protectors and Lenses
- 6.2.4.2 Prescription R/X Eyewear
- 6.2.4.3 Filter Lenses and Windows
- 6.2.4.4 Tinted Lenses and Windows
- 6.2.4.5 Photochromic Lenses

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6.2.5 Fitting the Device

- Careful consideration should be given to comfort and fit.
- Protectors that fit poorly will not afford the protection for which they were designed.
- Protectors should be fitted by qualified personnel.

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Questions and Answers

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