



Selecting the Appropriate Eye and Face Protection

FACT SHEET 63-012-0112

A primary goal of occupational safety is to prevent injury and to reduce the consequence of injuries should an accident occur. For eye and face protection, properly fitted and well maintained personal protective equipment (PPE) that is appropriate for the tasks and hazards is very important. The new ANSI Z87.1-2010, "American National Standard for Occupational and Educational Personal Eye and Face Protection Devices," made significant changes to the eye protection requirements. While the previous versions were organized by protection devices, the new ANSI is organized according to hazards. This was done specifically with the aim to make selection of protective eyewear easier.

Hazard Assessment

The safety hazard assessment of a workplace is required under the Occupational Safety and Health Administration (OSHA) requirement, 29 CFR 1910.132(d). The employers are required to assess hazard and determine the types of personal protective equipment (PPE) required. Employers are required to provide needed PPE at no cost to employees and to provide the training needed on the proper use and care of PPE. Hazard assessment should be led by an industrial hygienist (IH) or safety officer but should also involve workers and their supervisors. The importance of a written hazard assessment that clearly documents the hazards and protection requirements cannot be overstated.

Selecting the Right Protection

The best source for appropriate eye protection is the ANSI Z87.1-2010. However, it is important to recognize that the new ANSI did not make the previous ANSI versions obsolete. While OSHA automatically incorporates the latest national consensus standard such as ANSI into its requirement (29 CFR 1910.133(b)), it also recognizes that implementation of any new standard will take time due to manufacturing capability and the cost of replacement. Therefore, the previous ANSI Z87.1 standards (2003 and 1989 (R-1998)) are still applicable. Eye protection that is currently in use which meets the level of protection identified in hazard assessment and meets any of the above ANSI standards can continue to be used.

A significant change in the new standard is in the impact protection requirement. The previous distinction between primary and secondary protectors has been discarded, and products are now classified either "non-impact" or "impact" rated protectors. Faceshields, for example, which were considered secondary protectors to be used over safety glasses or goggles will now be rated as either non-impact or impact on their own. Another significant change is the extended side protection requirement for safety glasses. Safety glasses, including prescription safety glasses, are now required to have side shields which may be either permanently attached or removable.

Tri-Service Vision Conservation and Readiness Program (TSVCRP) recommends use of impact rated eye protectors in all cases. Because faceshields are not designed to serve as primary eye protection, TSVCRP also recommends the continued use of safety glasses or goggles in combination with faceshields regardless of the faceshield's impact rating. TSVCRP recommends the use of safety glasses with side protection that extends back at least 10 mm from the front plane of cornea of the eye.

Another source for eye protection selection is the OSHA's PPE selection guide. Overall, the types of hazard and recommended protection are similar to the ANSI Z87.1-2010. The PPE selection link is at:
<http://www.osha.gov/SLTC/etools/eyeandface/ppe/selection.html>.

**Tri-Service Vision Conservation and Readiness
U.S. Army Public Health Command
Aberdeen Proving Ground, MD 21010-5403
410-436-2714 or DSN 584-2714**

Visit our website: www.DoDVision.com or E-mail: Tri-ServiceOptometry@amedd.army.mil

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TSVCRP Selection Chart for Eye and Face Protection*

Types of Hazard	Common Tasks	Specific Hazard	Protection
IMPACT	Chipping, grinding, machining, masonry work, riveting, sanding, woodworking, sawing, drilling, chiseling, and powered fastening	Flying fragments, objects, large chips, particles, sand, dirt, etc	Impact rated spectacles with side protection, goggles with direct or indirect ventilation, and faceshields. For severe exposure, use faceshield over spectacles or goggles. Marking: Z87+ or Z87-2+ (Rx frame)
CHEMICALS	Acid and chemical handling, degreasing, plating, use of cleaning products, paint and clean-up products, pesticide and herbicide use	Splash and Irritating mists	Goggles with indirect ventilation (eye cup or cover type). For severe exposure, use faceshield. Full-facepiece respirator Marking: D3
HEAT	Furnace operations - pouring, casting, hot dipping, gas cutting, and welding	Hot sparks	Spectacles with side protection, goggles with direct or indirect ventilation, and welding helmet. For severe exposure, faceshields worn over spectacles or goggles protection.
		Splash from molten metal	Faceshields worn over goggles, Full-facepiece respirator, and loose-fitting respirator worn over spectacles.
		High temperature exposure	Screen faceshields, reflective face shields.
DUST	Woodworking, buffing, general dusty conditions	Nuisance dust	Goggles with direct or indirect ventilation. Full-facepiece respirator. Marking: D4 (dust), D5 (fine dust)
OPTICAL RADIATION	Welding: Electric Arc	Protection from optical radiation is directly related to filter lens density. Select the darkest shade that allows adequate task performance.	Welding helmet over spectacles or goggles, handshield over spectacles or goggles. Typical lens shade: 10-14.
	Welding: Gas		Welding helmet over spectacles or goggles, welding goggles, and welding faceshield over spectacles or goggles. Typical lens shade: 3-6
	Torch brazing and soldering	Marking note: W - shade number U – UV scale number L – glare scale number R - IR scale number S – special purpose	Spectacles, welding goggles, welding helmet or faceshield over spectacles or goggles, and welding respirator. Typical lens shade: 3-4 (brazing), 1.5-3 (soldering)
	Cutting		Welding goggles, welding helmet or faceshield over spectacles or goggles, and welding respirator. Typical lens shade: 3-6
	Glare		Spectacles with or without side protection and faceshield over spectacles or goggles.

* Based on ANSI Z87.1-2010, Annex I, Selection Chart. Multiple and simultaneous exposure to a variety of hazards exists. Adequate protection against the highest level of each of the hazards should be provided. Protective devices do not provide unlimited protection.