

tenistics of the wearer (such as hair and head structure), need for eye protection, and other factors

Selection of hearing protectors

No matter how good a hearing protective device may be, its comfort has a great deal of influence on how well it will be accepted. Some people cannot wear plugs for physical or psychological reasons. Others may not be able to wear muffs. Consequently, many hearing conservation programs will include both types so the user may select the one most acceptable to him.

Face and Eye Protection

Protection of the eyes and face from injury by physical and chemical agents or by radiation is vital in any occupational safety program. In fact, this type of protection has the widest use and the widest range of styles, models, and types.

The eye and face protection standard, *Practice for Occupational and Educational Eye and Face Protection* (Z87.1), is a fairly comprehensive document. It sets performance standards, including detailed tests, for a broad area of hazards—excluding only X rays, gamma rays, high-energy particulate radiations, lasers, and masers.

Besides general requirements, applying to "all occupations and educational processes," the standard provides requirements on the following:

- Rigid welding helmets
- Welding hand shields
- Nonrigid welding helmets
- Attachments and auxiliary equipment—lift fronts, chin rests, snoods, aprons, magnifiers, etc
- Flammability
- Face Shields
- Goggles—eyecup (chipper's), dust and splash, welder's, and cutter's
- Spectacles—metal, plastic, and combination

Some of the requirements of the standard

are stated generally. For example: "Aprons or bibs for helmets shall be of nonflammable, nonconducting material that is flexible and capable of withstanding disinfection."

Other requirements are more precise. As regards flammability, for example—"The thinnest section of the rigid helmet or hand shield shall not burn at a rate greater than 3 in. per minute when tested by inserting one end of a 5 by 1½ in. strip of the helmet material in a blue-flame Bunsen burner."

The most significant changes of Z87.1 from the previous Z2.1-1959 Standard are

- A stringent requirement for the impact resistance of the lens when in frames. The revision illustrates the test block with two figures and prescribes that "A 100-m diameter steel ball, weighing approximately 2.4 oz shall be dropped in free fall from a height of 50 in. onto the horizontal upper surface of the lens, impinging the lens within a circular area of a ¾-in diameter centered at the lens mechanical [geometric] center. The lens shall not be chipped and the lens shall not be displaced from the frame eye in this test." Supplementing this test for lens in frame—glass and plastic—are impact resistance tests for lens on block and breakage pattern. Also specified are tests for penetration resistance (plastic), flammability (plastic), haze (plastic), and ultraviolet, luminous, and infrared transmittance (plastic and glass).
- A new requirement for lenses in welder's and cutter's goggles to be hardened to meet impact resistance requirement. "All glass filter lenses or plates shall be heat-treated and meet the impact-resistance requirements."
- A specific selection chart for eye and face protection, including recommendations for particular hazards and operations. The chart also includes line drawings of 11 types of goggles, spectacles, shields, and helmets (see Fig. 19-15).
- Disinfection requirements are more exact—"Completely immerse the protector for 10 minutes in a solution of modified phenol, hypochlorite, or quaternary ammonium compounds at a room temperature of 68 F."