

Goggle Safety

What Do the ANSI Standards Really Mean?

Appropriate eye protection is extremely important in the science classroom. As you compare the wide array of goggles and safety glasses, you often see the phrase “Meets ANSI Z87+ Standards.” In the *Flinn Scientific Catalog/Reference Manual* we list several eyewear styles, all of which meet the ANSI standard. Obviously, there must be more to choosing safe eyewear than merely picking any style that meets this standard. To choose the most suitable eyewear for yourself and your students, it is helpful to understand ANSI and its relationship to school laboratory regulations.

What Is ANSI Z87+?

The American National Standards Institute (ANSI) is a nonprofit association that publishes standards covering a broad range of equipment and industries. The complete title of the current ANSI document pertaining to eyewear is American National Standard for Occupational and Educational Personal Eye and Face Protection, ANSI Z87.1–2010. This document includes standards for several different styles of safety eyewear ranging from eyeglass-type spectacles to heavy-duty welding helmets. The document is organized according to the hazards that might be faced and allows an instructor or employer to select the appropriate safety eyewear based on the hazards they intend to face. These hazards include: impact and coverage, droplet/splash, dust, fine dust, and optical radiation. The previous versions of this standard did not include tests to determine protection against splash, dust, or fine dust.

For a clear understanding of how these standards relate to your choice of laboratory eyewear, it is helpful to know more about ANSI and Z87+.

- ANSI is not a federal agency. As an independent association it is not involved in establishing or enforcing the OSHA Laboratory Standard.
- ANSI does not test, inspect or approve eyewear. The eye protection manufacturer can choose to contract an independent testing facility to conduct tests to determine if their products meet ANSI standards.
- There are important factors that are difficult to measure and are not covered in Z87+ that must be considered when choosing eyewear. Among these are durability, comfort, and anti-fog performance.

The easiest way to determine the type of protection the eyewear provides is to look at the frames of the goggles. Molded into each

frame is a series of letters and numbers that refer to the level of protection the eyewear is certified.

- Z87—The eyewear meets the basic criteria of the standard.
- Z87+—The eyewear is able to withstand the impact of a high velocity projectile without compromising safety.
- D3—The eyewear protects the eyes and face from droplets and splashes.
- D4—The eyewear protects against dust.
- D5—The eyewear protects against fine dust (vapor).

An example of the markings you can expect to see on a goggle frame that protects against splash and high impact is Z87+D3.

Keep in mind that not all eyewear is created equal. There are a lot of cheaply made goggles on the market that will not survive even one semester. How safe are goggles that meet ANSI standards, but will be left in a desk drawer, unworn, because they are broken or uncomfortable?

- Eyewear should fit comfortably and securely. Try different styles and sizes to find the right fit.
- Chemical splash goggles should have a soft, pliable flange that seals around the eyes. The hard plastic edge on models lacking a flange becomes extremely uncomfortable.
- Availability of replacement parts (headbands, lenses, vent covers) is a real cost-saving advantage.
- Anti-fog performance is affected by temperature and humidity. Experiment with different eyewear styles and features (vents and fog-free lenses) to find the best eyewear for your classroom.

The Choice Is Up To You

As a responsible science teacher, you must select eyewear that provides you and your students the most suitable protection from the hazards involved in your laboratory activities. The following regulations address the role of the teacher's judgment in selecting suitable eye protection:

Occupational Safety and Health Administration OSHA 1910.1450 (Laboratory Standard) Section D(6)

School laboratories should include “protective apparel compatible with the required degree of protection for substances being handled.”



Popular Flinn Visor Goggles offer comfort and coverage.

As you ponder which type of protective eyewear to purchase, or whether eye protection is needed at all, keep the following suggestions in mind:

- Will you be using heat, glassware or chemicals in the lab? If so, it is a good basic policy to use protective eyewear.
- Chemical splash goggles carrying the D3 rating should be worn whenever hazardous chemicals are used.
- The educational laboratory is a unique environment where each student is often surrounded by other students conducting experiments. Hazards could come from any direction. Protective eyewear should provide sufficient angular coverage.
- Face shields that provide added splash protection coverage should not be worn alone. Always wear the appropriate goggles or safety glasses underneath a face shield.

Conclusion

While ANSI has established many standards for a variety of protective eyewear, it does not provide specific standards for several factors important to the science teacher. Among those factors are durability and comfort. It is the teacher's responsibility to keep these factors in mind when selecting eyewear. As clearly stated in the *Flinn Scientific Catalog/Reference Manual*, “You, the instructor, should decide what type of eyewear your students must wear in every case.” The information and high quality eye and face protection Flinn provides will help you make an informed, responsible choice.