

Goggle Safety

What Do the ANSI Standards Really Mean?

An important obligation of a responsible science teacher is to provide students with safe, appropriate eye protection. As you compare the wide array of goggles and safety glasses, you often see the phrase “Meets ANSI Z87.1 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 which meets this standard. To choose the most suitable eyewear for yourself and your students it is helpful to understand ANSI and its relationship to regulations concerning school laboratories.

What Is ANSI Z87.1?

The American National Standards Institute (ANSI) is a non-profit association which 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 Practice for Occupational and Face Protection, ANSI Z87.1—2003*. This document includes standards for several different styles of safety eyewear ranging from eyeglass-type spectacles to heavy-duty welding helmets. Each style has its own standards.

ANSI’s objective is to provide basic performance requirements for eye and face protection.

For example, the tests listed below are two of the standards for removable goggle lenses:

- Lenses shall resist impact from a 25.4 mm diameter steel ball dropped from 127 cm.
- Lenses shall resist penetration from a projectile weighing 44.2 g dropped from 127 cm.

For clarification of the relevance of these standards to your choice of laboratory eyewear it is helpful to understand more about ANSI and Z87.1.

- 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 Z87.1 that must be considered when choosing eyewear. Among these are durability, comfort, anti-fog performance, and chemical splash protection.

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 which seals around the eyes. The hard plastic edge on models lacking a flange becomes extremely uncomfortable.
- The 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 application.

Chemical Splash Protection

Just because eyewear meets Z87.1 standards does not necessarily mean it provides adequate protection from the dangers of splashed chemicals. Eyewear that does not provide a complete, snug seal around the eyes may be fine for some activities but not when using hazardous chemicals. When vent openings are provided on splash goggles, the vents should be indirect, with covers and/or baffles preventing straight-line passage of liquids into the goggles.

The Choice Is Up To You

As a responsible science teacher, you must select eyewear which 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:

ANSI Z87.1 Section 7.3(3) page 15

The teacher must “make a judgement in selection of the appropriate protective equipment so that the protection is greater than the estimated hazards”.

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”.



Basic Recommendations

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 designed to provide full coverage around the eyes 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 which 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, comfort, and chemical splash protection. 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.