



Occupational Prescription Eyewear

ANSI Z87.1–2003



Summary of the new ANSI Standard
for Safety Prescription Eyewear



Sophisticated Style. Advanced Eye Protection.

ANSI Z87.1-2003



Current Standard	American National Standard Practice for Occupational and Educational Personal Eye and Face Protective Devices ANSI Z87.1-2003
Scope and Purpose	The scope and purpose of the standard is laid out in section 2 and states “This standard sets forth criteria related to the description, general requirements, testing, marking, selection, care, and use of protectors to minimize or prevent injuries, from such hazards as impact, non-ionizing radiation and chemical type injuries, in occupational and educational environments including, but not limited to, machinery operations, material welding and cutting, chemical handling, and assembly operations. This standard provides minimum requirements for protectors including selection, use, and maintenance of these protectors as devices to minimize or prevent eye and face injuries.”
Frame Tests	<p>High Mass Impact Test: Spectacle frames shall be capable of resisting an impact from a pointed projectile weighing 500 g (17.6oz) dropped from a height of 127cm (50.0 in). No piece shall be detached from the inner surface of any frame component, and the test lens shall be retained in the frame. This test is intended to determine the capability of a protector to resist impact from relatively heavy, pointed objects traveling at low velocity. 4 samples are tested: all must pass.</p> <p>High Velocity Impact Test: Spectacle frames shall be capable of resisting impact from a 6.35mm (0.25 in) diameter steel ball traveling at a velocity of 45.7 m/s (150ft/s). No contact with the eye of the headform is permitted as a result of impact. No piece shall be detached from the inner surface of any frame component, and the test lens shall be retained in the frame. This test is intended to determine the capability of a protector to resist impact from high velocity, low mass projectiles. 2mm Polycarbonate lenses are used in the frame testing. 20 samples are tested: all must pass.</p>
Lens Thickness	<p>Prescription and Removable Plano Lenses</p> <p>Basic Impact Lens Requirements Basic impact spectacle lenses shall be not less than 3.0mm (0.118 in) thick, except those lenses having a plus power of 3.00D or greater in the most plus meridian in the distance portion of the lens which shall have a minimum of a thickness no less than 2.5mm (0.098 in).</p> <p>High Impact Lens Requirements When used in a frame marked Z87-2, the lenses shall not be less than 2.0mm (0.079 in) thick. This requirement is in recognition of the thickness needed to maximize lens retention in the frame in a high velocity impact.</p>

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<p>Lens Tests</p>	<p>Prescription Lenses</p> <p><i>Basic Impact Lens Requirements</i></p> <p>Drop Ball Test</p> <p>Basic impact spectacles lenses shall be capable of resisting impact from a 25.4 mm (1 in) diameter steel ball dropped from a height of 127 cm (50.0 in). The lens shall not fracture as a result of this test. Glass lenses shall be individually tested. Statistical sampling is an acceptable means of demonstrating compliance for plastic lenses.</p> <p>Penetration Test (Plastic Lenses Only)</p> <p>Basic impact plastic spectacle lenses shall be capable of resisting penetration from a weighted projectile weighing 44.2 gm (1.56 oz) dropped from a height of 127 cm (50.0 in). The lens shall not fracture or be pierced through as a result of this test.</p> <p><i>High Impact Lens Requirements</i></p> <p>High impact lenses shall be capable of resisting an impact from a 6.35mm (0.25 in) diameter steel ball traveling at a velocity of 45.7 m/s (150 ft/s). No piece shall be detached from the inner surface of the lens. In addition, the lens shall not fracture.</p>												
<p>Special Comment on Safety Plano Spectacles</p>	<p>Safety prescription eyewear spectacles will only comply to the new standard if the frame is stamped with "Z87-2", or if the manufacturer certifies that the frame has been tested and passed the new requirements.</p> <p>Note that eyewear specifically manufactured for use as a Plano safety spectacle will be stamped "Z87" (not "Z87-2"). As a result, Plano safety spectacles previously used for safety prescription eyewear will no longer meet the Standard.</p> <p>Plano safety spectacles stamped "Z87" and not "Z87-2" have not been tested according to the SRx testing requirements and do not meet the new standard for safety prescription eyewear.</p>												
<p>Lens Marking</p>	<p>All markings shall be permanent, legible, and placed so that interference with the vision of the wearer is minimal.</p> <table border="1" data-bbox="414 1386 1502 1711"> <thead> <tr> <th>Mark</th> <th>Indication</th> </tr> </thead> <tbody> <tr> <td>Manufacturer's logo</td> <td>Complies with Basic Impact Requirements</td> </tr> <tr> <td>Manufacturer's logo and a "+"</td> <td>Complies with High Impact Requirements</td> </tr> <tr> <td>Shade Number</td> <td>Filter lens which complies with Table 1</td> </tr> <tr> <td>S</td> <td>Special purpose lens, complies with table 2, but not with table 1</td> </tr> <tr> <td>V</td> <td>Photochromic lens</td> </tr> </tbody> </table> <p>Our logo "A" is your assurance that all AOSafety eyewear meets or exceeds the new standard.</p>	Mark	Indication	Manufacturer's logo	Complies with Basic Impact Requirements	Manufacturer's logo and a "+"	Complies with High Impact Requirements	Shade Number	Filter lens which complies with Table 1	S	Special purpose lens, complies with table 2, but not with table 1	V	Photochromic lens
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Frame Marking	Spectacle frames including the front, both temples, and removable sideshields shall be marked with the manufactures mark or symbol and "Z87-2". Fronts shall be marked with the A-dimension (eye size) and DBL (distance between lenses). Temples shall be marked with their overall length.
Warning Label	To assure you of the highest quality and to safeguard against improper eyewear use, AOSafety provides a care and instruction label with every pair of SRx eyewear. Warning shall be provided to alert the user when the lens (es) of a protector meets only the basic impact requirements of this standard. A clearly visible, removable label or hang tag shall be affixed to any protector which does not meet the high impact requirements of this standard. The label or tag shall contain an appropriate warning indicating that the lens meets basic impact requirements, but should not be relied upon for protection from high impact exposures. The label or tag shall also state that it is to be removed only by the user.
Sideshields	The use of protectors providing side protection should be encouraged wherever practical.
Corrosion	Metal parts are boiled in a 10% aqueous solution of sodium chloride for 15 minutes. Then immersed in the same solution at room temperature, removed and allowed to dry for 24 hours. The metal parts are then rinsed in lukewarm water and allowed to dry. The function of the spectacles shall not be impaired by the corrosion.
Flammability	The front, temple, lens and removable sideshields shall not burn at a rate greater than 76mm (3 in) per minute.
Enforcement	OSHA under Regulation 29 CFR Standard 1910.132 conducts the enforcement of Personal Protective Equipment. Safety Spectacles are considered Personal Protective Equipment.

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