



TRAINING MODULE: PROTECTIVE EYEWEAR

PURPOSE: To provide an overview of the safety benefits of ballistic military grade eyewear.

TIME: 20 Minutes

OBJECTIVES:

- Become familiar with how eye injuries occur
- Learn about the safety benefits of military specification eyewear
- Become familiar with available products in the field that meet described specifications

PARTICIPANTS MATERIALS:

- Participant Manual

TRAINER MATERIALS:

- Training Manual
- PowerPoint Presentation

Protective Eyewear



Zero Officers Killed or Injured

Protective Eyewear

- 2.4 Million Americans a year suffer an eye injury
- Eye injuries are the #1 cause of preventable blindness in the United States
- 90% of all injuries could have been prevented with the use of eye safety protection

2.4 million Americans a year suffer an eye injury which is an average of 1000 people per day.

40-70 thousand of those are left with significant visual impairment.

Eye injury is the #1 cause of preventable blindness in the United States.

Over 90% of all injuries could have been prevented with the use of eye safety protection.

- 3 out of every 5 injured were not wearing any eye protection.
- 40% of those wearing protection were wearing the wrong kind.

Eye injuries cost over **\$300 million per year** in medical expenses, lost productivity, and workers compensation claims.

US Military estimates the loss of an eye costs the US Government approximately **\$1 million per eye**.

Protective Eyewear

■ Common Causes

- Flying Particles (70% of all accidents)
- Chemicals (20% of all injuries)
- Attached or Swinging Objects
- UV Exposure

Flying particles: flying and falling objects account for 70% of all accidents.

Chemicals: Splashes in unshielded eyes account for 20% of all injuries

Attached or Swinging Objects

UV Exposure: Long hours in the sun without proper eye protection increase the chances of developing eye problems such as cataracts.

Protective Eyewear

- **Authorized Protective Eyewear List (APEL)**
 - List of eyewear that meets standards for ballistic and UV protection
 - Statistics show that the APEL program has helped reduce eye injuries by 40%
 - 30% of soldiers responding to a current survey stated that their APEL eyewear saved their eyes from injury.

Recognizing the importance of eye safety, the US Military created an **Authorized Protective Eyewear List (APEL)**

- List of approved eyewear that meets standards for ballistic and ultraviolet protection.
- Statistics show that the APEL program has helped reduce eye injuries by 40%.
 - From 2004 – 2005, the US Army noted that eye injuries for all Coalition Force Combat injuries reduced from 16% to 10%.
 - Clear indication that eye protection on the battlefield reduces eye injuries.

30% of the respondents to an ongoing survey to assess the impact and usage of Military Combat Eye Protection responded yes when asked if they had a personal experience where their eye protection saved their eyes from injuries.

Protective Eyewear



"...the sniper's bullet hit my gun mount and continued on to fragment and splatter on the right lens of my <MIL Spec> sunglasses. While I was knocked down with the impact of the bullet, I suffered only minor injuries to my head and was back in action within the week."

-Sgt. Ross Shores of the 172nd Stryker Brigade



Images courtesy of ESS, Inc.

Sgt. Ross Shores (172nd Stryker Brigade) Example:

July 3, 2006, Sgt Ross was shot in the face with a 7.62 sniper round in Mosul, Iraq; his Military Spec glasses saved his life.

Quote from Sgt. Ross

"The snipers bullet hit my gun mount and continued on to fragment and splatter on the right lens of my sunglasses. While I was knocked down with the impact of the bullet, I suffered only minor injuries to my head."

Protective Eyewear

■ Eye Pro Standards

■ ANSI Z87.1

- American National Standards Institute

■ Military Specifications (MIL SPEC)

- Ballistic Resistance:

- Spectacles MIL-PRF 31013 = Vo of .15 caliber projectile at 650 ft/sec
- Goggles MIL-STD-662 = Vo of .22 caliber projectile at 560 ft/sec

Eye Pro Standards

ANSI Z87.1 sets forth requirements for the design, construction, testing and use of eye protection devices, including standards for impact and penetration resistance.

- ANSI (American National Standards Institute): A non-profit organization that serves as administrator of the US private sector voluntary standardization system.

Primary Objective: promote and facilitate voluntary consensus standard and conformity assessment systems.

- Minimum requirements:
 - Provide adequate protection against hazards for which they are designed
 - Reasonably comfortable
 - Fit securely, without interfering with movement or vision.
 - Be capable of being disinfected if necessary and be easy to clean
 - Be durable
 - Fit over, or incorporate prescription eyewear

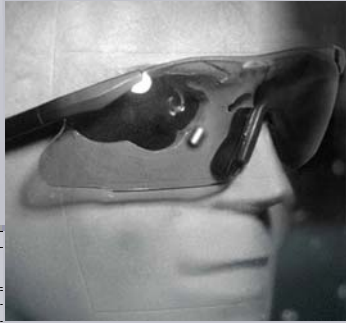
Military Specifications (MIL SPEC)

- Ballistic resistance: V_0 test
 - Spectacles: MIL-PRF 31013 = V_0 of .15 Caliber rojectile at 650 ft/sec
 - Goggles: MIL-STD-662 = V_0 of .22 Caliber projectile at 560 ft/sec

- Optical – prismatic deviation and distortion
- Abrasion- scratching/hazing
- UV absorption
- Chemical Resistance
- Temperature
- Workmanship
- Compliance with ANSI Z87.1

Protective Eyewear

Images of the impact effects on spectacles tested to the MIL Spec MIL PRF 31013



MIL Spec Eye Pro



ANSI Z87.1 Eye Pro

Both test subject spectacles have polycarbonate lenses, but dramatically different capabilities

MIL Spec standards are over 6 times greater than ANSI. This is important specifically when dealing with ballistic impacts.

Protective Eyewear



Eyewear meeting MIL Specs have been shown to stop shotgun blasts from approximately 10 meters.

In September 2007, the Army re-categorized eye protection as an armor product instead of an individual equipment item. They realized eye protection is more about survival than it is about sun, wind, and dust protection.

MIL Specs cans stop a shotgun blast from 10 meters.

Some goggles have been shown to protect the wearer from a 12 gauge shotgun blast from 15 feet away using No. 6 lead shot with no penetration.

Protective Eyewear

■ Hazards Law Enforcement Officers Face

- Handle firearms and explosives
- Exposure to body fluids/blood borne pathogens
- Automobile accidents and potential for fragmentation
- Other similar threats to eye safety as common occupational hazards

Hazards Law Enforcement Officers Face

- Handle firearms and explosives
- Exposure to body fluids/blood borne pathogens
- Automobile accidents and potential for fragmentation
- Other similar threats to eye safety as common occupational hazards.

Dust, low velocity fragments, and high velocity impacts pose significant threats to law enforcement officers on patrol or in training.

Almost all ballistic injuries can be prevented using polycarbonate shields currently available in select commercial spectacles and goggles.

The majority of police officers wear civilian style fashion/sports sunglasses that can increase injury from secondary fragmentation of lenses that shatter under impact, posing more danger than defense.

Wearing eyewear designed for sports or “performance” can result in eye injuries that could have been avoided with tactical eyewear designed for combat.

Protective Eyewear

Authorized Protective Eyewear List

<https://peosoldier.army.mil/pmequipment/eyewear.asp>

- **Body Specs** – Pistol
 - www.bodyspecs.com/
- **Eye Safety Systems (ESS)** - ICE2
 - www.esseyepro.com/
- **Revision** – Sawfly
 - www.revisioneyewear.com/
- **UVEX** – XC
 - www.uvex.us/
- **Oakley** - SI Ballistic M Frame
 - www.oakley.com/
- **Wiley** - X-PT-1 and X-SG-1
 - www.wileyx.com



There are several other commercially available brands and models that meet MIL SPEC not specifically listed on the APEL.

Here is a list of current approved eyewear for the military listed on the APEL. The most updated list can be found at the peosoldier web site. There are still a number of commercially available brands and models that military specifications not listed on the APEL. Generally prices range from \$50-\$125.

To prevent eye injuries, wear the correct eye protection for the job.

REFERENCES:

Authorized Protective Eyewear List (APEL) October 2006

Eyewear Protection for the Warfighter http://www.defense-update.com/features/du-2-07/infantry_eyewear.htm

The Eyes Have It. U.S. Army Aeromedical Research Laboratory; U.S. Army Medical Research & Materiel Command (January 2000)

Modern Combat Protective Eyewear http://www.defense-update.com/products/e/eyewear_tactical.htm