

Standards for High-Visibility Safety Apparel Frequently Asked Questions and Concerns

The *need to be seen* is critical for worker safety, especially for workers who perform tasks on or near moving vehicles or equipment. By wearing high-visibility garments, workers can draw attention to themselves to prevent injuries and fatalities from struck-by hazards in complex work environments, when the ability to be seen at all times is necessary.

The American National Standard ANSI/ISEA 107-2010, *High-Visibility Safety Apparel and Headwear* is an industry consensus standard that specifies requirements for apparel and headwear that is capable of visually signaling the user's presence. It was developed by the International Safety Equipment Association (ISEA) and first published in 1999. Since then, the standard has been recognized and compliance mandated by federal, state and local authorities as well as private industry entities. Today, the U.S. Department of Transportation's Federal Highway Administration (FHWA) requires nearly all workers in or near a highway right-of-way to wear garments that comply with the standard.

The broad acceptance of this standard led the public safety sector to ask ISEA to write a high-visibility standard that addresses the unique needs of their workers, including EMS personnel and police officers. In 2006, ISEA published ANSI/ISEA 207, *American National Standard for High Visibility Public Safety Vests*. Garments that meet this standard are now accepted by FHWA as an option for firefighters, emergency responders and law enforcement personnel to comply with its worker visibility rules.

ISEA has prepared this brochure to answer some of the commonly asked questions about the standards and their relationship to federal, state and local regulations; describe the changes in the 2010 revision to ANSI/ISEA 107, and explain differences between the ANSI/ISEA 107 and ANSI/ISEA 207 standards.

1. What is included in the ANSI/ISEA 107 standard?

The standard details the performance specifications for materials used in the construction of high-visibility garments. Specific test procedures are included for background materials, and retroreflective and combined-performance materials. The standard also provides criteria for apparel design and addresses labeling and use instruction requirements.

2. What do the Performance Classes mean?

Garments are classified as Performance Class 1, 2 or 3 depending on the total area of visible background and retroreflective material. The amount of required visible material increases with each Performance Class. Performance Classes give users a way to specify the most appropriate garment for the use environment and hazard.

3. The designation of the standard is ANSI/ISEA 107-2010. I have heard of ANSI standards but what is ISEA and what is its role in this standard?

ISEA, the International Safety Equipment Association, is the trade association for manufacturers of safety and personal protective equipment. ISEA members are dedicated to protecting the health and safety of all workers through the development of equipment standards and the education of users on safe work practices and exposure prevention. ISEA is accredited by the American National Standards Institute (ANSI) as a standard developing organization. As secretariat of the standard, ISEA prepares the content of the standard, publishes approved versions and is responsible for technical interpretations on the document. While the standard and revisions are drafted by ISEA members, final approval is determined by consensus vote of a panel of stakeholders representing a variety of interests including users, government agencies, test laboratories, industry experts and producers.

4. Will the standard be revised and if so, when?

ANSI procedures require that some formal action - revision, reaffirmation or withdrawal – be taken on ANSI standards every five years. ISEA anticipates that an update to the 2010 version will be available in 2015.

5. Is this standard the same as other industry standards for high-visibility apparel?

In writing the first edition of ANSI/ISEA 107 in 1999, the developers of the standard used many of the requirements of the European standard for high-visibility apparel (EN 471) because they had confidence in the reasoning and science supporting the performance criteria that it established. In turn, the ANSI/ISEA 107 standard was used as the basis for the Canadian high-visibility apparel standard (CSA Z96). While there are some similarities with respect to performance of the materials and some of the test methods used, differences in detail do exist, related to certain configurations and acceptable designs. For this reason, ISEA cannot state that if an item meets the ANSI/ISEA 107 standard, it is guaranteed to meet another high-visibility apparel standard.

6. Do open weave or mesh fabrics meet the background materials requirements of the standard?

ANSI/ISEA 107 is a performance standard and the material specifications are written to allow any materials that meet the requirements for visibility and durability. All background materials must meet the performance requirements in the standard. Because the performance of a garment made from open weave or mesh fabric may be affected by what the user wears under it, it may be more difficult to meet the standard requirements, but there is no exclusion for such materials.

7. Does the standard only permit the exact designs that are provided in the appendix of the standard?

No. The designs provided in the appendix of the standard are only examples. There may be other configurations that meet the intent, design requirements, and minimum performance criteria of the standard that may differ from the limited examples in the appendix. The standard does require that certain design aspects be met such as placement of retroreflective material, the width of such material and the amount of material needed to classify a garment in a Performance Class.

8. What is the new requirement for retroreflective material in the shoulder area?

Garments without retroreflective material encircling the sleeves (e.g. vests) are now required to have 150 cm² (23.25 in²) of such material in the shoulder area to provide 180° visibility of the wearer. This area is defined as 15 cm down from the shoulder high point, front and back.

9. How does ANSI/ISEA 107-2010 require flame resistance of a garment to be indicated?

In response to end-user requests, the 2010 version includes optional testing criteria to evaluate high-visibility garments for flame resistance. A garment may be evaluated by using one of a list of ASTM or NFPA standards. If an ASTM specification is used, the garment is shown to be compliant with the flame resistance criteria in the standard by including the letters "FR" and the testing method designation on the label. If an NFPA standard is used, the garment must have the separate label required by the NFPA standard. It should be noted that vests cannot be certified as NFPA 1971 or 1977. To determine which FR standard is required, consider the hazard and type of apparel needed. If protection is needed from arc flash, consider ASTM F1506; for potential flash fire exposures, consider NFPA 2112. If you are unsure, consult a qualified safety professional.

10. Why does ANSI/ISEA 107 not cite ASTM D6413 or NFPA 701 as acceptable for flame resistance?

ASTM D6413 is a flame test with no pass-fail criteria and is a small scale test used in broader specifications as part of a flame resistance battery. NFPA 701 is a test for textiles used in curtains, wall coverings, awnings, etc. It is not designed for clothing. The flame resistance specifications noted in ANSI/ISEA 107-2010 represent ISEA's effort to require that high visibility apparel designated as flame resistant is compliant to a flame resistance standard which is intended for apparel and not other kinds of materials. The FR methods cited in the ANSI/ISEA 107-2010 do not allow materials which would melt or drip under high thermal exposure.

11. Does the ANSI/ISEA 107-2010 standard mandate that garments be third-party certified?

The standard requires that the background material and retroreflective or combined-performance material used in the construction of a finished garment be certified by an accredited, independent third-party laboratory to ensure that the materials meet the specified performance criteria imposed by the standard. The standard includes test reports that are to be used when evaluating the various materials.

The finished item may be evaluated by an accredited, independent third-party or by the manufacturer of the item who attests that the garment is made up of compliant materials, meets the design criteria stated in the standard, and includes the requisite markings and labels. A garment compliance certificate, to be completed and signed by the manufacturer, is included in the standard as well. All test reports and forms can be found on ISEA's website www.safetysite.org.

12. I have only found larger sized garments that meet the standard, but I have smaller workers that need appropriately fitting garments to work safely.

The garment design guidelines, specifically the amount of background material required, may make it difficult for a compliant garment to fit smaller workers. Health and safety managers may wish to consider the selection of a different garment style to accommodate small-framed personnel. For example, a sleeveless Class 2 garment may be used for workers wearing sizes other than "small." Workers requiring a small size may need to be provided a "half-sleeve" or "full-sleeve" garment to accommodate the requirement for the minimum quantity of fluorescent background material specified for a Class 2 garment. Additionally, garments which incorporate combined performance reflective materials may use less background fabric resulting in smaller garments which meet requirements. Other solutions to accommodate "small sized" garments may be recommended by your safety apparel supplier.

13. What ANSI/ISEA 107 Performance Class does the 2009 MUTCD require?

The 2009 edition of the Manual on Uniform Traffic Control Devices (MUTCD) requires that all workers within the right-of-way who are exposed either to traffic or to work vehicles and construction equipment within a Temporary Traffic Control zone must wear garments compliant with ANSI/ISEA 107 Performance Class 2 or 3. This applies to emergency and incident responders and law enforcement personnel as well, although they are permitted to wear ANSI/ISEA 207-compliant vests.

The 2009 MUTCD section on Worker Safety Planning requires that a safety plan should be in accordance the OSHA General Duty Clause. It also requires a risk assessment to be performed by a qualified safety professional, for each job site and job classification. This risk assessment should be used to determine whether Performance Class 2 or Performance Class 3 apparel is appropriate.

14. What edition of ANSI/ISEA 107 does the 2009 MUTCD require?

The 2009 MUTCD requires the use of ANSI/ISEA 107-2004 or equivalent revisions. The Federal Highway Administration published an official interpretation on May 20, 2010, recognizing that garments labeled to ANSI/ISEA 107-2010 may be used to comply with this requirement.

15. Does OSHA require the use of high-visibility safety apparel for construction workers working in highway/construction work zones at risk of being struck by traffic?

Yes. In 2009 OSHA issued a letter of interpretation that it will use the General Duty Clause to require high-visibility apparel for flaggers, workers exposed to vehicle traffic near excavations, and to other workers in highway/construction zones who are exposed to traffic. The letter cited the MUTCD as the authority for its enforcement.

16. What are the major differences between ANSI/ISEA 107 and ANSI/ISEA 207?

ANSI/ISEA 207-2006 is intended for emergency and incident responders, as well as law enforcement personnel who have competing tactical needs which can make it problematic to use ANSI/ISEA 107 compliant personal protective equipment. ANSI/ISEA 107 is intended for default general occupational use. ANSI/ISEA 207 does NOT replace ANSI/ISEA 107.

The only configuration of apparel in ANSI/ISEA 207-2006 is a vest, whereas ANSI/ISEA 107 identifies a variety of apparel items. As such, there is only one performance class for items that are designated as ANSI/ISEA 207 compliant. The ANSI/ISEA 107 standard defines three performance classes of items, as well as class E pants and headwear, whose classification depends on the minimum amount of visible material used in the item's construction.

There are also different design requirements for a vest depending on which standard is being used to demonstrate compliance. For example, encircling bands of retroreflective material are required for ANSI/ISEA 207. ANSI/ISEA 107 requires that retroreflective material must be placed on the garment in such a manner as to provide 360° visibility to the wearer, but does not require encircling bands.

This represents a summary of major differences between these standards, but not all differences. You are encouraged to compare the actual standard text for a comprehensive list of differences.

17. Where can I find more information on ISEA and its members?

Additional information about ISEA is available at www.safetyequipment.org. The website includes a Buyer's Guide that users can search to find manufacturers that supply high-visibility products and apparel, as well as other types of personal protective equipment.

Member Companies of the ISEA High Visibility Products Group

3M Company
5.11 Tactical Series
ArcWear.com
Avery Dennison Corporation
Blauer Manufacturing Co., Inc.
ERB Industries, Inc.
Ergodyne
Honeywell Safety Products
I. Spiewak & Sons, Inc.
Intex, div. of White Knight Engineered Products
Iron Horse Safety Specialties
Kimberly-Clark Professional
King Tech Industry, Inc.
LaCrosse Footwear Inc.
Lakeland Industries, Inc.

Logistical Services International, LLC
Lohmann & Rauscher, Inc.
MCR Safety
Mine Safety Appliances Company
M.L. Kishigo Manufacturing Co.
NASCO Industries, Inc.
OccuNomix International LLC
OK-1 Manufacturing Company
Pacific Safety Supply, Inc.
Reflexite North America
Safe Reflections, Inc.
Tingley Rubber Corporation
Transportation Safety Apparel
Vizcon, LLC
Williamson-Dickie Manufacturing Company

ANSI/ISEA Standards

The following standards publications are available in print or electronic form at www.safetyequipment.org.

ANSI/ISEA 101-1996 (R2008) *American National Standard for Limited-Use and Disposable Coveralls -- Size and Labeling Requirements*

ANSI/ISEA 102-1998 (R2009) *American National Standard for Gas Detector Tubes - Short Term Type for Toxic Gases and Vapors in Working Environments*

ANSI/ISEA 104-1998 (R2009) *American National Standard for Air Sampling Devices--Diffusive Type for Toxic Gases and Vapors in Working Environments*

ANSI/ISEA 105-2005 *American National Standard for Hand Protection Selection Criteria*

ANSI/ISEA 107-2010 *American National Standard for High-Visibility Safety Apparel and Headwear*

ANSI/ISEA 110-2009 *American National Standard for Air-Purifying Respiratory Protective Smoke Escape Devices*

ANSI/ISEA 113-2008 *American National Standard for Fixed and Portable Decontamination Showers*

ANSI/ISEA 207-2006 *American National Standard for High-Visibility Public Safety Vests*

ANSI/ISEA Z89.1-2009 *American National Standard for Industrial Head Protection*

ANSI/ISEA Z87.1-2010 *American National Standard for Occupational and Educational Personal Eye and Face Protection Devices*

ANSI/ISEA Z308.1-2009 *American National Standard - Minimum Requirements for Workplace First Aid Kits*

ANSI/ISEA Z358.1-2009 *American National Standard for Emergency Eyewash and Shower Equipment*

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