PPE PERSPECTIVES

ISEA is an ANSI-accredited standards developing organization, and the trade association for PPE.

FREQUENTLY ADDRESSED TOPICS IN HIGH-VISIBILITY SAFETY APPAREL

The need to be seen is critical for worker safety. Low visibility is a serious hazard for all workers who must perform tasks near moving vehicles or equipment. Workers must be visible to vehicle operators in all light conditions, and against complex backgrounds. The sooner a vehicle operator sees a worker, the longer the operator has to avoid an incident. High-visibility safety apparel and accessories dramatically enhance worker visibility.

The American National Standard for High-Visibility Safety Apparel and Accessories, ANSI/ISEA 107-2015, is a consensus standard that specifies requirements for apparel and accessories worn by workers to visually signal their 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.

ISEA has prepared this document to answer some of the commonly asked questions about the standard and its relationship to federal, state and local regulations; and describe the changes in the 2015 revision.

What is HVSA?

HVSA is shorthand for "High-Visibility Safety Apparel," which includes garments such as vests, jackets, pants, shirts, rainwear and coveralls that are designed and constructed to provide enhanced visibility to people working in hazardous situations under all light conditions. HVSA provides daytime and nighttime visibility enhancement for workers in occupational environments where they are exposed to struck-by hazards from moving vehicles, equipment and machinery, or wherever a risk assessment indicates a need to be seen. In the context of this discussion, HVSA refers to apparel and accessories that conform to the requirements of ANSI/ISEA 107-2015.

What is ANSI/ISEA 107-2015?

ANSI/ISEA 107-2015 is the *American National Standard for High-Visibility Safety Apparel and Accessories*. It is a voluntary consensus standard developed by the International Safety Equipment Association (ISEA) and approved by the American National Standards Institute (ANSI).

What's included in the standard?

ANSI/ISEA 107-2015 details the performance requirements for materials used in the construction of HVSA, specifically fluorescent background material and retroreflective or combined-performance material. The standard specifies the amount of material required for various types and classes of HVSA

and test procedures for determining performance of the material. The standard also includes requirements for garment configuration and construction, labeling and use instruction, along with suggested use scenarios and examples of garment design.

What are fluorescent, retroreflective and combined-performance materials?

Fluorescent materials are the fabrics used to make HVSA. These fabrics use special pigments to appear brighter than other colors, and enhance daytime visibility, especially in low light such as cloud cover, dusk, dawn, etc. ANSI/ISEA 107 specifies minimum performance characteristics for fluorescent yellow-green, orange-red and red background materials.

Retroreflective materials are added to HVSA in specific patterns, to provide visibility in low light, especially at night. These materials are designed to return light in the direction of the light's source, so that they will appear bright to a driver or machine operator when illuminated by a vehicle's headlights or other source of light.

ANSI/ISEA 107 also allows the use of combined-performance material, which has both fluorescent and retroreflective properties.

What's new in the 2015 edition of the standard?

ANSI/ISEA 107-2015 consolidates the requirements of ANSI/ISEA 107-2010 *American National Standard for High-Visibility Safety Apparel and Headwear* and ANSI/ISEA 207-2011 *American National Standard for High-Visibility Public Safety Vests* into a single, comprehensive document for all occupational tasks. While the standard maintains the familiar Performance Classes 1, 2 and 3 from previous versions, the 2015 edition establishes three HVSA types based on the expected use environments and work activities being performed. Responding to user concerns, the 2015 standard makes allowance for garments sized to fit smaller workers, and adds specifications for accessories such as gloves and armbands.

What are the HVSA Types and Performance Classes?

Like the previous editions of ANSI/ISEA 107, the standard classifies HVSA as Performance Class 1, 2 or 3, depending on the amount of visible background and retroreflective material. These Performance Classes give users a way to specify HVSA that is appropriate for the work environment and hazards:

- Performance Class 1 provides the minimum amount of required material to differentiate the wearer visually from non-complex work environments.
- Performance Class 2 includes additional amounts of high-visibility materials to allow design opportunities to define the human form more effectively.
- Performance Class 3 offers greater visibility to the wearer in both complex backgrounds and through a full range of body movements.

The 2015 edition also establishes three types of garments:

- Type O (off-road), for non-roadway use, where workers are not exposed to highway traffic or temporary traffic control zones. Type O HVSA is Performance Class 1.

- Type R (roadway), for use where workers are exposed to traffic from public access highway rights-of-way or roadway temporary traffic control zones. Type R HVSA may be Performance Class 2 or 3.
- Type P (public safety) for emergency and incident responders and law enforcement personnel who are exposed to struck-by hazards in roadway or off-road work environments. These garments provide additional options addressing competing hazards or the need for access to special equipment. Type P HVSA may be Performance Class 2 or 3.

How does the 2015 standard accommodate smaller workers?

Recognizing that wearing oversized garments may compromise safety, the standard allows a reduced area of visible background material for the smallest size garment offered in Type R, Performance Class 2 or 3. For example, the smallest Performance Class 2 HVSA may use a minimum of 540 sq. in. of background material, while the requirement for all other sizes is 775 sq. in. Type P garments have a smaller minimum material requirement, but they are designed for use by public safety workers.

Are there design requirements for HVSA?

Yes. HVSA must be designed to provide 360-degree visibility for workers. While the standard allows some flexibility in design, there are minimum requirements for the dimension and placement of retroreflective or combined-performance material around the torso, in the shoulder area or around the sleeves or pant legs. The 2015 standard also mandates balance of design, so that the front and back of a garment each has no less than 40% of the minimum required area of visible background and retroreflective or combined-performance materials. The standard includes examples of a number of garment design options.

Does HVSA have to match the designs shown in the standard?

No. The designs shown in the standard are examples, but other configurations will meet the minimum performance requirements of the standard.

Can accessories and garments be combined to meet the Performance Class requirements?

Supplemental HVSA such as pants, overalls, shorts, rain pants and gaiters are classified as Performance Class E when they meet the minimum visible material requirements of the standard. Class E items cannot be worn alone to satisfy HVSA PPE requirements, but when worn with a Performance Class 2 or 3 garment, the ensemble classification is Performance Class 3. No other combination of HVSA changes a classification. A Type O Performance Class 1 harness worn over a shirt made of fluorescent material cannot be classified Performance Class 2. Similarly, optional accessories such as gloves, arm or leg bands or headwear that meet minimum visible material content specified in the standard cannot be counted in the minimum area of visible material of the HVSA.

Can a garment have a logo or identification panel?

Logos and title panels are frequently used to identify workers wearing HVSA. ANSI/ISEA 107-2015 allows the use of logos and panels, but has strict requirements for their placement so that worker identification can be accomplished without compromising the visibility requirements of the HVSA.

What makes ANSI/ISEA 107 HVSA flame resistant? How can I tell?

Manufacturers have the option to have HVSA evaluated for flame resistance and labeled accordingly. The standard cites four ASTM and two NFPA standards or test methods as suitable for verifying flame resistance. The ANSI/ISEA 107 label include a statement regarding the garment's flame resistance. Garments tested using NFPA 1977 or 2112 require a separate label indicating certification to the NFPA standard. Neither ASTM D6413 as a standalone test nor NFPA 701 are recognized by ANSI/ISEA 107 as flame resistance standards for HVSA.

Is this standard the same as other industry standards for HVSA?

When the ANSI/ISEA 107 standard was first developed in 1999, it incorporated many features of the European standard for high-visibility apparel (EN 471), recognizing the reasoning and science behind that standard's performance criteria. In turn, the ANSI/ISEA 107 was later used as a basis for the Canadian high-visibility apparel standard (CSA Z96). While these standards are similar in performance requirements and test methods, there are differences in detail. For this reason, ISEA cannot state that HVSA meeting the ANIS/ISEA 107-2015 standard conforms to any other high-visibility apparel standard.

Does ANSI/ISEA 107-2015 require that HVSA be third-party certified?

The standard requires that the applicable tests for background and retroreflective or combined-performance material be conducted in a laboratory that is accredited to ISO 17025. Manufacturers verify that the garments satisfy all the requirements of the standard and complete a Declaration of Conformity. Neither third-party certification (by an ISO 17065 accredited body) nor independent laboratory testing is required in ANSI/ISEA 107-2015.

How can I tell if a garment meets the standard?

HVSA that conforms to the standard must have a label that shows the type and performance class, as well as other information about the garment. In addition, manufacturers are required to complete a Declaration of Conformity for each model of garment, showing that the materials have been tested in accordance with the standard, and that the design and construction meets the standard's requirements.

If you have questions about whether HVSA conforms to the standard, ask for the Declaration of Conformity.

What are the regulatory requirements for HVSA?

The Federal Highway Administration, in 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 that conform to ANSI/ISEA 107, Performance Class 2 or 3 (Type R in ANSI/ISEA 107-2015). This applies to emergency and incident responders and law enforcement personnel as well, although they are permitted to wear ANSI/ISEA 207-compliant vests (Type P in the 2015 standard).

Although the 2009 MUTCD referenced ANSI/ISEA 107-2004 and ANSI/ISEA 207-2006, the FHWA has published an official interpretation acknowledging that garments conforming to ANSI/ISEA 107-2015 are equivalent, and meet its requirements for both those standards.

The 2009 MUTCD section on worker safety planning requires that a safety plan be in accordance with 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 3 HVSA is appropriate.

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 other workers in highway/construction zones who are exposed to traffic. The letter cited the MUTCD as the authority for its enforcement.

What happened to ANSI/ISEA 207?

The *American National Standard for High-Visibility Public Safety Vests*, ANSI/ISEA 207, was developed in response to requests from the public safety sector for a standard for HVSA used by emergency and incident responders and law enforcement personnel. The standard's requirements differed somewhat from ANSI/ISEA 107 to accommodate tactical and identification needs, recognizing that these garments were not intended for general occupational use. The requirements of that standard have been incorporated into ANSI/ISEA 107-2015 as Type P, with a new Performance Class 3 to expand the types of public safety HVSA available.

ISEA, the International Safety Equipment Association, is the trade association for personal protective equipment and technologies. Its members are leading manufacturers, suppliers, test labs and distributors, 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 standards developing organization. In this role, ISEA prepares the content of the standard, manages the consensus and public review process leading to its approval, publishes approved versions, and is responsible for technical interpretations. While the standard and its revisions are drafted by ISEA member company representatives, its approval comes through a consensus vote of stakeholders representing a variety of interests including users, government agencies, test laboratories, industry experts and producers.