



## High-visibility safety apparel and Laundering of Flame Resistant Garments

Presented April 24, 2018



# WHAT IS THE CSA Z-96-15 STANDARD?

## High-Visibility Safety Apparel or HVSA

This Standard specifies requirements for occupational apparel that is

- (a) capable of signalling the user's presence visually; and
- (b) intended to provide the user with conspicuity in hazardous situations under any light conditions and under illumination by vehicle headlights.

Performance requirements are included for colour, retroreflection, and minimum areas, as well as for the configuration of the materials. Performance requirements are also provided for the physical properties of background materials used in the construction of high-visibility safety apparel (referred to as "HVSA" in this Standard). Test methods are provided in the Standard to ensure that a minimum level of visibility is maintained when garments are subjected to ongoing care procedures.

This Standard provides performance requirements for conspicuous materials to be used in HVSA and specifies classes of garments, minimum areas, and placement of these materials.

**Note:** *Conspicuity is enhanced by high contrast between clothing and the work environment against which it is seen.*

This Standard specifies minimum amounts of retroreflective materials, together with colour and requirements for placement of materials, for apparel used to enhance the visibility and safety of workers.

Categories of high-visibility garments are identified and appropriate markings for apparel are recommended.

# Z96-15 ELEMENTS

- **GARMENT DESIGN CRITERIA**  
Trim placement to enhance visibility and safety
- **CLASSIFICATION OF HIGH VISIBILITY GARMENTS**  
Three classes of garments
- **BACKGROUND MATERIAL – DAYTIME VISIBILITY**

# Z96-15 ELEMENTS

- RETROREFLECTIVE MATERIAL – NIGHTTIME VISIBILITY
- FLAME RESISTANT GARMENT ISSUES
  - Special design and performance allowances for garments intended for FR applications
- CERTIFICATION AND LABELING
  - Detailed Garment Labels

# STRIPING REQUIREMENTS

## Stripes/Bands Configuration



Stripes/bands shall be laid in the following distinctive standardized pattern:

- A symmetric “X” on the back extending from the shoulders to the waist.
- Two vertical stripes on the front extending over the shoulders and down to the waist.
- A waist-level horizontal stripe/band fully encircling the HVSA.
- For Class 3 apparel additional stripes/bands encircling both arms and both legs shall be added.
- Compliant non-continuous stripes/bands (segmented) are allowed.

Note: Hoods in the lowered position should not hide the required stripes/bands

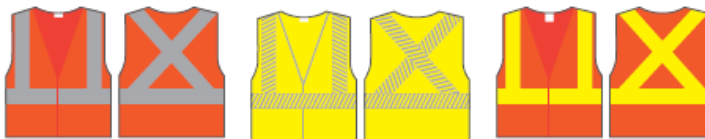
# CLASS 1 / CLASS 2

## Class 1 Apparel



Basic harness or stripes/bands over the shoulder(s) and encircling the waist.

## Class 2 Apparel



Full coverage of upper torso (front, back, sides and over the shoulders). Minimum side coverage of 50% from bottom edge of garment to shoulder point.



# CLASS 3

## CAN/CSA Z96 Garment Classes (cont.)

### Class 3 Apparel



Class 3 apparel is Class 2 apparel plus arm and leg bands. These bands shall be composed of combined performance stripes/bands or a combination of retroreflective and background material.

# FLAME RESISTANT GARMENTS LEVEL FR

## Flame Resistant Allowance for Class 1 Level FR Apparel Only

Bands/stripes with both retroreflective and fluorescent materials where the retroreflective is no less than 19 mm. The retroreflective shall meet the photometric requirements found in Table 5 (Level 2). This garment will be called Class 1 Level FR.

## Flame Resistant Garments – Examples

### Class 1/Level FR



The design of the stripes or bands on the garment should also comply with Clause 4.4.2.1



# LABEL REQUIREMENTS AND BASICS OF SELECTION

## Label Requirements



(An example of an acceptable label)

## Selection, Care and Use

- Evaluate the workplace background or the environment
- Consider the work conditions (e.g. indoor or outdoor?)
- Calculate the degree of exposure to hazards
- Speeds of vehicles (warning distances and times)
- Existing engineering and administrative hazard controls
- Compatibility with other PPE used
- Sight lines of vehicle operators
- Special occupational needs

Purchasers of HVSA (High-Visibility Safety Apparel) should request proof of compliance to the CSA Z96 standard. Refer to CSA Z96-15 Annex A for information on the guidelines for selection, use and care of HVSA, including a HVSA selection process.

# Flame Resistant Garments



Untreated  
Cotton  
Shirt

FR Shirt

# Flame Resistant Garments: Not a Superman Suit!

- FR Fabrics and Garments are intended to resist ignition, prevent the spread of flame away from the immediate area of high heat impingement, and to self-extinguish almost immediately upon removal of the ignition source.



# How Can Laundering Effect FR Garments?

- Wash Cycle and Water Temperature- Normal or Cotton Cycle. Any water temperature is fine, as long as soil is removed. Very high water temperatures can cause excessive shrinkage in cotton based FR.
- Use soft water- hard water can leave deposits on the surface of the garment that can negate the flame resistant properties of the garment, or act as an accelerant.

- Do not use bleach or liquid non-chlorine bleach. The chlorine will destroy the FR polymer and therefore reduce the flame resistance of the garment.
- No hydrogen peroxide.
- The use of stain removers is allowed, but not the use of any additives such as starch or fabric softeners as they can coat the fibers and mask the FR properties of the garment. They can even act as an accelerant.
- The garments can be dried, but do not overdry. Excessive shrinkage may occur.



# Best Practices

- Garments may be dry cleaned using petroleum solvent or perchloroethylene.
- Industrial Launderer's are well versed in the care of both reflective and flame resistant garments. In addition, Industrial Laundries can make compliant repairs to flame resistant garments. It is recommended that you use one of these two options.





THANK YOU FOR YOUR TIME!

