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# Safety Apparel Overview

## 3M™ Scotchlite™ Reflective Material

An overview of CAN/CSA Z96-2015  
High-visibility safety apparel standard



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# Introduction

Standards for personal protective equipment are developed by CSA with the support of many Canadian employer/labour users, producers, special interest groups and regulators. The CAN/CSA Z96-15 addresses high visibility safety apparel, an area where consistency in Canadian regulations and standards was necessary.

## CAN/CSA Z96-15: Elements

### Classification of High Visibility Garments

- Three classes of garments

### Garment Design Criteria

- Trim placement to enhance visibility and safety
- Apparel design considerations for emergency first responders

### Background material – Daytime Visibility

- Performance tests and colour specifications

### Retroreflective material – Nighttime Visibility

- Performance specifications

### FR issues

- Special design and performance allowances for garments intended for FR applications

### Certification and Labels

- Self-Declaration
- Detailed Garment Labels

## Classification of Garments

	Class 3 Apparel	Class 2 Apparel	Class 1 Apparel
<b>Description of Minimal Coverage</b>	Class 2 apparel plus bands encircling both arms and both legs. These bands shall be composed of combined performance stripes/bands or a combination of retroreflective and background material.**	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. (apparel design allowances for emergency first-responder HVSA Class 2 and Class 3)	Basic harness or stripes/bands over the shoulder(s) and encircling the waist.
<b>Background material minimums</b>	See Above	See Above	0.14 m <sup>2</sup> (minimum) (217 in <sup>2</sup> )
<b>Retroreflective or combined performance material used in conjunction with background material</b>	0.20 m <sup>2</sup> (310 in <sup>2</sup> )	0.13 m <sup>2</sup> (202 in <sup>2</sup> )	0.10 m <sup>2</sup> (155 in <sup>2</sup> )
<b>Photometric performance</b>	Level 2	Level 1 or Level 2	Level 1 or Level 2
<b>Combined-performance material without background material</b>			0.20 m <sup>2</sup> (310 in <sup>2</sup> )
<b>Photometric performance</b>			Level 1 or Level 2

\* As a special case, bib-style overalls are recognized as Class 2. Bib-style overalls are not required to have retroreflective material over the shoulders, but may include retroreflective or combined-performance material around the legs.

\*\* Retroreflective or combined-performance materials used on garments intended for FR protection applications may be performance levels lower than Levels 1 and 2. As a minimum, they shall meet performance levels (Level FR) specified in Table 7.

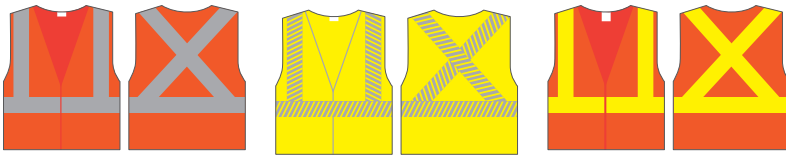
# CAN/CSA Z96 Garment Classes

## Class 1 Apparel



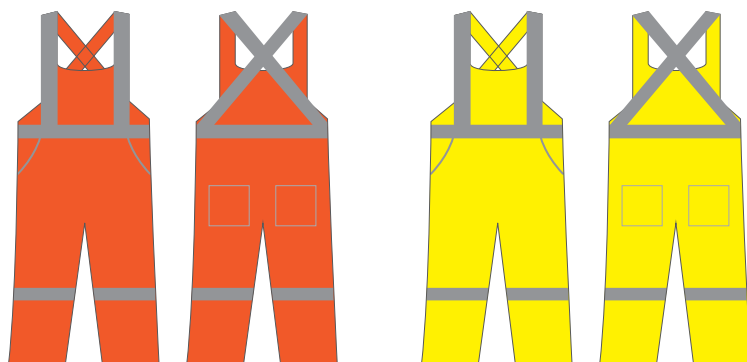
Basic harness or stripes/bands over the shoulder(s) and encircling the waist.

## 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 2 Apparel (Special Case)

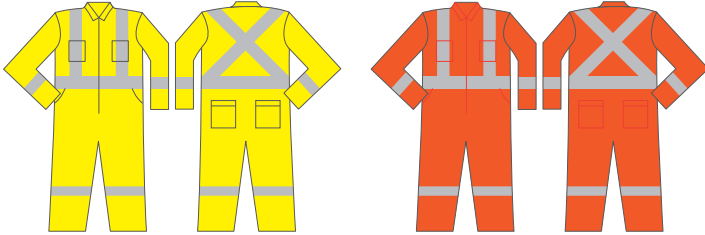


As a special case, bib-style overalls are recognized as Class 2 apparel. Retroreflective material over the shoulder is not required.

Note: The leg bands shown here are optional.

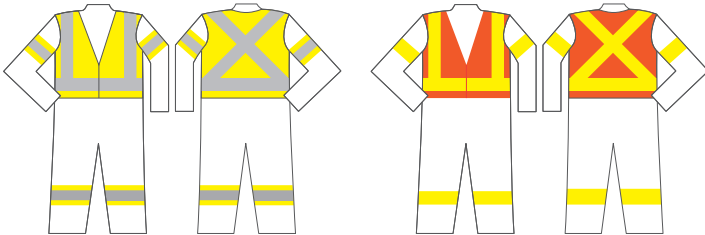
# CAN/CSA Z96 Garment Classes (cont.)

## 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.

## Class 3 Apparel (Minimum)



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.

# CAN/CSA Z96 Alternative Garment Designs

## Class 2



## Class 3



# Stripes/Bands Configuration

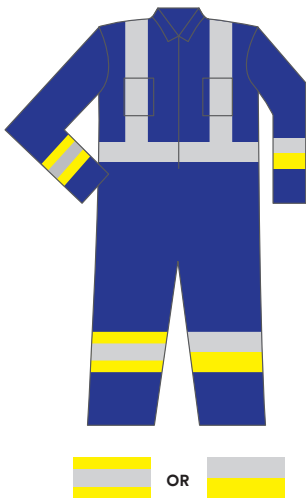


Stripes/bands shall be laid in the following distinctive standardized pattern:

- 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

# Stripes/Bands Requirements



- All stripes/bands shall be not less than 50 mm in width.
- Gaps for fastening or seams shall not exceed 50 mm.
- Multiple stripes/bands must be spaced a minimum of 50 mm apart.
- Stripes/Bands near edges shall not be placed less than 50 mm from edge.
- Horizontal stripes/bands placed on sleeves or pant legs shall encircle the arms or legs.
- Horizontal stripes/bands on the legs shall be placed at or below the knee.
- If arm and leg bands on Class 3 apparel are composed of retroreflective then there must be 50 mm of compliant background material on one side or 25 mm on either side of the retroreflective stripes/bands.

# Patches and Lettering

Section	CSA Z96-2015
Non retroreflective	Total area < 105 cm <sup>2</sup> . If on the front of the garment a maximum of 25 cm <sup>2</sup> of either or both of the reflective stripes/bands may be covered. The reflective stripes/bands cannot be covered if on the back of the garment.
Retroreflective	Total area < 500 cm <sup>2</sup> and placed anywhere on the garment but cannot obscure the recognizable pattern of the stripes/bands.



# Chromaticity and Luminance

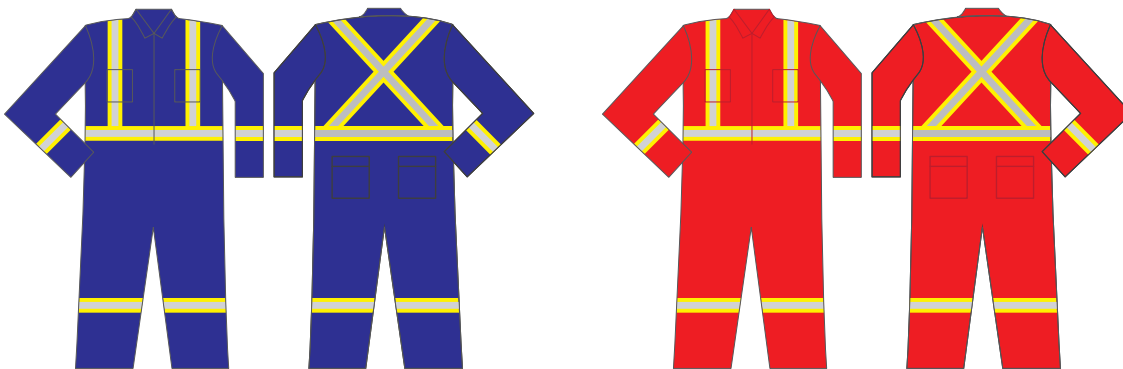
Fluorescent and combined performance materials shall comply with one of the 3 colours in Table 2. Bright background materials shall comply with one of two colours specified in Table 3.

## 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

### Class 3/Level 2





# Label Requirements

**Safetywear Co.**  
**Utility Coverall – Model 1000**

3M™ Scotchlite™ Reflective Material –  
8940 Silver Industrial Wash FR Fabric

Size: Extra Large

CAN/CSA Z96

Class 3

Level 2

FR Bright Orange-Red



Machine wash warm, 60°C (140°F)  
Only non-chlorine bleach, if needed  
Tumble dry low  
Iron medium  
Dry-clean normal

(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.



# CAN/CSA Z96-15: Summary

## Minimum trim width:

- 50 mm

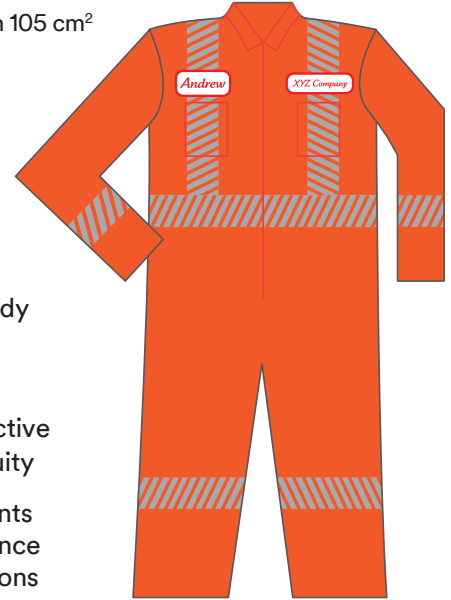
## Stripes/bands pattern:

- Symmetric “X” on the back
- Two vertical stripes on the front
- Waist-level horizontal stripe extending entirely around garment

## Others:

- Gaps for fastening or seams shall not exceed 50 mm
- Bands must be placed no closer than 50 mm from edges

- ID Patches and Lettering
  - Retroreflective not greater than 500 cm<sup>2</sup>
  - Non-retroreflective not greater than 105 cm<sup>2</sup>
- Examples of manufacturer’s compliance declaration forms
- Full body bright or fluorescent coverage provides better conspicuity than partial body coverage
- Coverage of 360° around the body provides better conspicuity in all viewing directions
- Contaminated or dirty retroreflective materials provide lower conspicuity
- For optimal performance, garments should be maintained in accordance with the manufacturer’s instructions



CAN/CSA Z96-15 Classes	<p style="text-align: center;"><b>Class 1</b></p>	<p style="text-align: center;"><b>Class 2</b></p>	<p style="text-align: center;"><b>Class 3</b></p>
Trim Levels (Minimum Ra)	Level FR (>65 Ra)	Level 1 (>250 Ra)	Level 2 (>330 Ra)
Background Colours (Fluorescent or Bright)	<p style="text-align: center;"><b>Yellow-Green</b></p>	<p style="text-align: center;"><b>Orange-Red</b></p>	<p style="text-align: center;"><b>Red (Fluorescent only)</b></p>



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## Important Notice to User

This brochure is a general guide only. A copy of the CAN/CSA Z96-15 standard can be purchased from the Canadian Standards Association online store at [www.csa.ca](http://www.csa.ca)



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