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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
Description of Minimal Coverage	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.
Background material minimums	See Above	See Above	0.14 m ² (minimum) (217 in ²)
Retroreflective or combined performance material used in conjunction with background material	0.20 m ² (310 in ²)	0.13 m ² (202 in ²)	0.10 m ² (155 in ²)
Photometric performance	Level 2	Level 1 or Level 2	Level 1 or Level 2
Combined-performance material without background material			0.20 m ² (310 in ²)
Photometric performance			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.

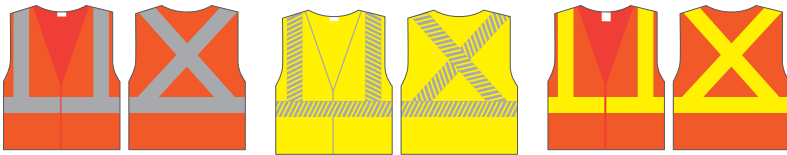
CAN/CSA Z96 Garment Classes

Class 1 Apparel



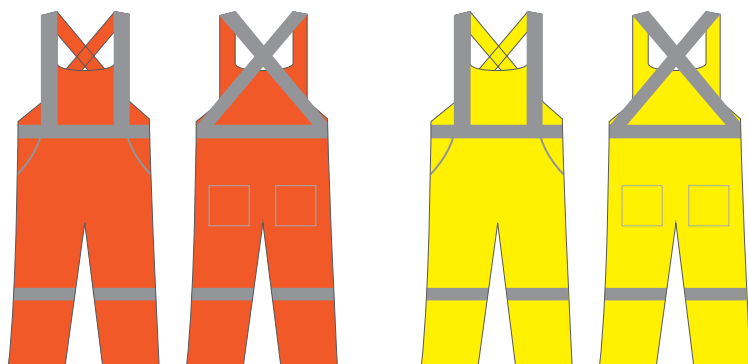
Basic harness or stripes/bands over the shoulder(s) and encircling the waist.

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)

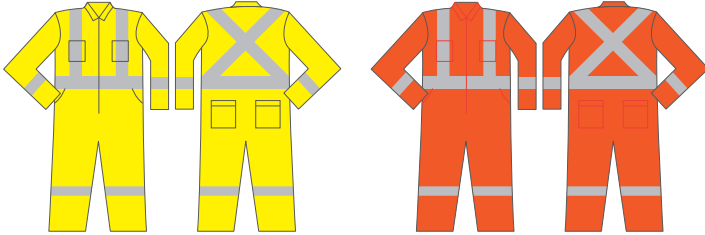


As a special case, bib-style overalls are recognized as Class 2 apparel. Retroreflective material over the shoulder is not required.

Note: The leg bands shown here are optional.

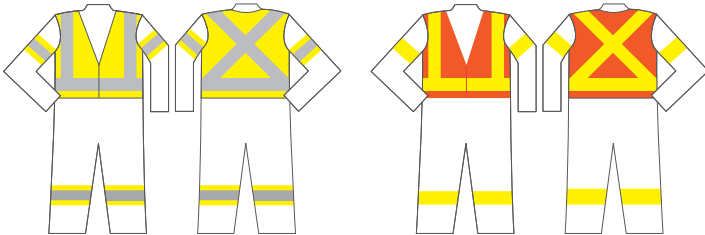
CAN/CSA Z96 Garment Classes (cont.)

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

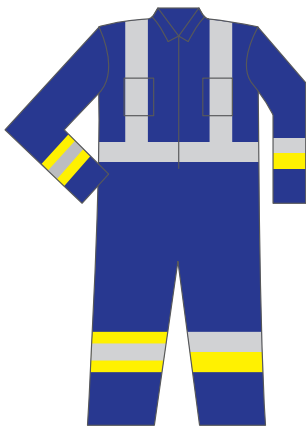


Stripes/bands shall be laid in the following distinctive standardized pattern:

- 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 ² . If on the front of the garment a maximum of 25 cm ² 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 ² 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

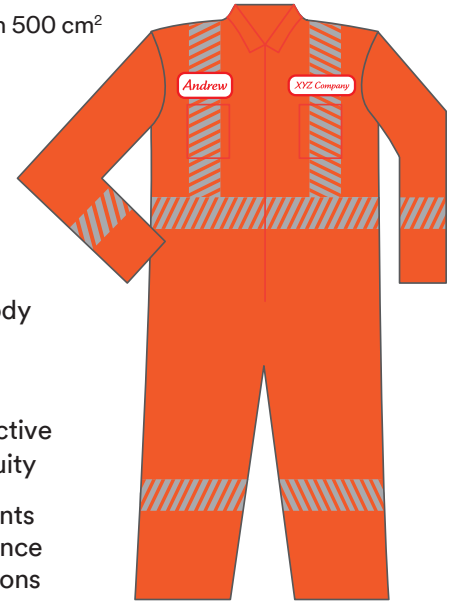
Stripes/bands pattern:

- 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 105 cm²
 - Non-retroreflective not greater than 500 cm²
- 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;">Class 1</p>	<p style="text-align: center;">Class 2</p>	<p style="text-align: center;">Class 3</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;">Yellow-Green</p>	<p style="text-align: center;">Orange-Red</p>	<p style="text-align: center;">Red (Fluorescent only)</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



Personal Safety Division
3M Canada
P.O. Box 5757
London, ON N6A 4T1
1-800-267-4414
3M.ca/Safety
1-800-3M HELPS (1-800-364-3577)
www.3M.com/ca/besaferbeseen

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