

Subject: Traffic Control Manual for Work on Roadways - SAFETY APPAREL AND TRAFFIC CONTROL RETRO- REFLECTIVITY SPECIFICATIONS

1.0 Background

Road user and worker safety is critical during work on roadways. Recent safety research and technical innovations have motivated many Federal, Provincial/State and Local agencies in North America to update their work zone policies. This circular updates specifications for safety apparel and retro-reflective sheeting on signs and other traffic control devices defined in the Traffic Control Manual for Work on Roadways (TCMWR). Specifications that are not noted in this circular have not been changed.

2.0 Implementation Schedule

The specifications in this circular will be phased in over a 3-year period starting January 1, 2006. Effective January 1 2009, these specifications will be mandatory. The BC Ministry of Transportation (MoT) will be calling for these on contracts by way of Special Provisions.

3.0 Policy

3.1 Safety Apparel

Safety headgear and safety protective requirements remain unchanged. The following specifications amend the safety apparel references in Sections 2.3.5 and 2.3.7

The safety apparel specifications will improve the visibility of workers on roadways. The safety apparel shall comply with both the CSA Z96-02 standard, and with the Workers' Compensation Board of British Columbia's (WCB) requirement for a 100 mm (4 in.) contrasting colour stripe. Note that the minimum reflective property of the 50 mm (2 in.) retro-reflective tape required by the CSA Z96-02 standard is higher than that of the WCB Standard. Therefore, safety apparel that complies with the CSA Z96-02 standard provides higher conspicuity at night. The specifications are defined as follows:

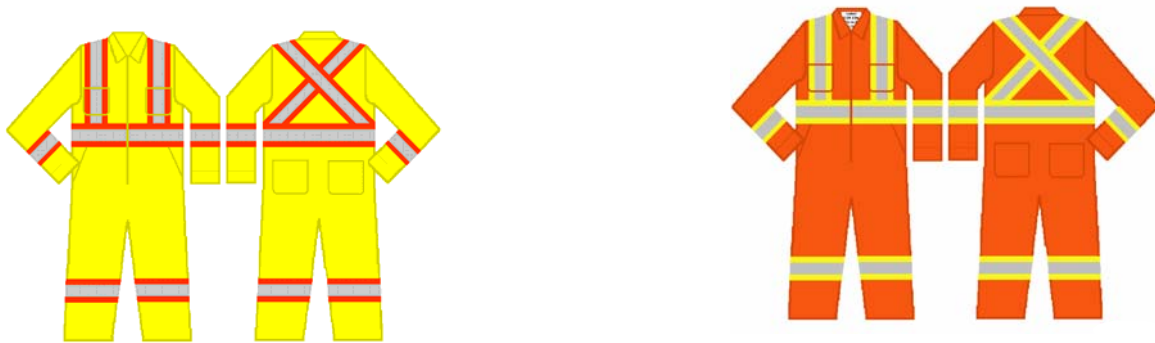
3.1.1 Traffic Control Persons (TCPs)

TCPs must wear safety apparel conforming to **Class 3** garments meeting both the CSA Z96-02 standard and the WCB requirement. The BCMoT's two accepted colours for the background material used on these high-visibility safety garments are fluorescent yellow-green and fluorescent orange-red (note: the orange-red is often labeled as fluorescent orange). These garments require a fluorescent contrasting colour stripe that is a minimum 100 mm (4 in.) in width. The accepted colours for the contrasting stripe are fluorescent yellow-green or fluorescent orange-red (note: the orange-red is often labeled as fluorescent orange). The retro-reflective bands of tape used on

these garments are at a minimum 50 mm (2 in.) in width and shall be of a contrasting colour to that of the background material. The illustration below shows this configuration in cover-alls. Alternatively, a combination of a torso vest (or jacket) with wrist and ankle bands that meet the CSA Z96-02 standard and the WCB requirements may be worn. Horizontal stripes/bands placed on the sleeves or pants shall encircle the arm or leg.

The stripes/bands used on the high-visibility safety apparel shall be laid out in the following pattern:

- 1) a symmetric “X” on the back of the garment extending from the shoulders to the waist;
- 2) two vertical stripe/bands on the front extending over the shoulders and down to the waist;
- 3) a waist-level horizontal stripe/band that extends entirely around the circumference of the torso. The stripe/band extends from the back to the bottom of the vertical stripe/bands on the front where they end at the front closure mechanism (snap/zipper etc.). Gaps in retro-reflective materials to allow for fastening in front not to exceed 50 mm.



Class 3 Apparel.....Minimum areas of high-visibility material coverage requirements → Full coverage of upper torso--- (front, back, sides, and over the shoulders), plus bands encircling both arms and both legs.

3.1.2 Non TCP workers

Non TCP workers must wear safety apparel conforming to **Class 2** (torso vest or jacket) meeting both the CSA Z96-02 standard and the WCB requirement. The illustration below shows this configuration in a vest. The fluorescent background material, the fluorescent 100 mm (4 in) contrasting stripe and the 50 mm (2in) retro-reflective bands of tape shall meet the same specification requirements as that for Traffic Control Person’s TCPs listed above.



Class 2 Apparel.....Minimum areas of high-visibility material coverage requirements → Full coverage of upper torso— (front, back, sides, and over the shoulders).

3.1.3 Comparison between Canadian Standards Association (CSA) and BC Workers' Compensation Board of BC (WCB) on Classification of Safety Apparel in terms of the "body coverage" provided.

CSA Z96-02 Classes of High-Visibility Apparel

- ⇒ *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 shoulder. Bib-style overalls are recognized as Class 2 apparel.*
- ⇒ *Class 3 Apparel* *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. **Class 3 is required by MoT for use by TCP's for work on MoT roadways as specified in this Technical Circular T-09/05 Revised 03/01.***

WCB Garment Types

- ⇒ *Type 1 Garments:* *Vest, shirt or other similar garment worn on the torso with a florescent background and attached Visibility Enhancing⁽¹⁾ (VE) trim. WCB regulation state (2005): TCP's may use Type 1 or Type 2 plus full circumference wrist bands fitted with a minimum 5 cm (2in) wide fluorescent retro-reflective strip.*
- ⇒ *Type 2 Garments:* *Jacket, coat, coverall or other garment with bright coloured background and attached VE⁽¹⁾ trim. WCB regulation state (2005): TCP's may use Type 2 plus full circumference wrist bands fitted with a minimum 5 cm (2in) wide fluorescent retro-reflective strip.*
- ⇒ *Type 3 Garments:* *A harness type garment worn on the torso, fabricated from parallel strips of contrasting colours. The harness has fluorescent and retro-reflective properties.*

**** 1. VE Trim: Visibility enhancing trim attached to the garment. The Trim has fluorescent and retro-reflective properties.

3.1.4 ID Patches and Lettering (Taken from the Z96-02 document section 4.2.3)

Non-retroreflective ID patches or lettering shall have a total area no greater than 100 cm² and may be placed on the garment as long as they do not cover any part of the required retro-reflective strips/bands.

Reflective ID patches or lettering that meet the requirements of Table 5, 6, and 7 in the CSAZ97-02 standard shall have a total area of not greater than 500 cm² and may be placed anywhere on the garment. The ID patches and lettering should be situated so as not to obscure the recognizable pattern of the stripes/bands.

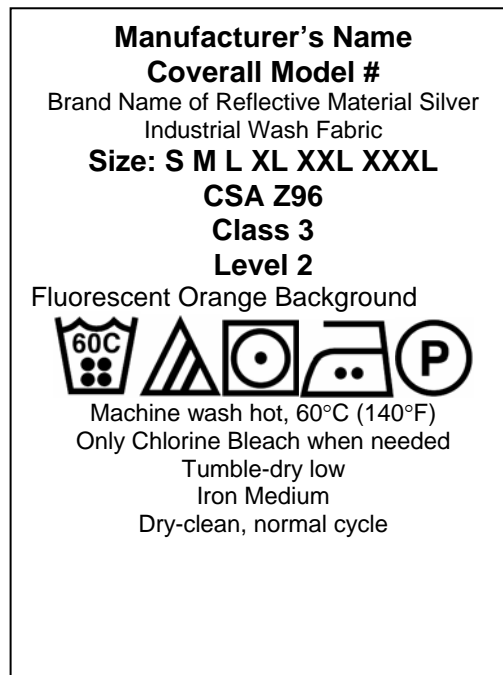
3.1.5 Labeling

Manufacturers' should note that in order to comply with CAN/CSA Z96-02, the garment label must include the following items:

1. Name, trade mark or other means of identification of the manufacturer or authorised representative;
2. Designation of the product type (i.e., Coverall), commercial name or code;
3. Size designation;
4. CSA Z96;
5. Apparel Class and Level of performance for the retroreflective material;
6. An indication of background material as fluorescent or bright coloured; and
7. An indication of Flame Resistant (FR) performance if applicable.

*Note: To meet BC MoT approval for use on roadways under their jurisdiction the Workers' Compensation Board of British Columbia's (WCB) requirement for a 100 mm (4 in.) fluorescent contrasting colour stripe is also required on the Safety Apparel.

Example:



3.2 Traffic Control Devices

ASTM D 4956-04 *Standard Specification for Retroreflective Sheeting for Traffic Control* is used as the standard. The specifications listed below have been selected to provide the best visibility possible.

3.2.1 Warning Signs & Barricades

The following amends Sections 2.1 and 2.2.2.5 of the TCMWR.

Work zone signs placed on a rigid substrate must use fluorescent orange sheeting meeting a minimum of ASTM D 4956-04 Type 9. Roll-up style must use fluorescent orange sheeting meeting a minimum of ASTM D 4956-04 Type 6 sheeting. Note that Technical Circular T-02/05 provides details on substrate types.

Barricades must use orange/white retro-reflective ASTM D 4956-04 Type 9 sheeting. Bands on barricades should be a minimum of 100mm in width for small barricades and 150 mm in width for large barricades.

3.2.2 Channelizing / Delineation Devices

The following amends Section 2.2.2 & 2.2.4 of the TCMWR.

All channelizing devices defined in the TCMWR as requiring reflectorization, including cones, tubular markers and flexible drums must use reflective bands conforming to a minimum of ASTM D 4956-04 Type 6.

Tubular markers must have two white bands a minimum of 100mm in width near the top of the post. The first band will be placed approximately 50mm down from the top edge. The gap between the bands must be approximately 150mm.

Flexible drums must have five uniformly spaced bands of a 100mm minimum width with the colour order being: (from top-to-bottom) orange-white-orange-white-orange. The orange bands must be fluorescent.

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