



Canadian Standards Association  
Etobicoke, Ontario  
**To the Part I Committee**

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Subject No. 3051

Chair: R.E. Edwards

Date: April 30, 2002

Title: Colour Coding of Neutrals, Appendix B Note to Rule 4-028(1) and Spec. 38

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**Submitted by:** A.Z. Tsisserev of the City of Vancouver on February 12, 2002

**Proposal:** Add Appendix B Note to Rule 4-028(1) to read as follows:

4-028(1) *The intent of the requirement to identify an insulated neutral conductor up to and including No. 2 AWG is deemed to be met when a covering consists of continuous white or natural gray outer finish, or of three continuous white stripes on black insulation along the entire length of the neutral conductor.*

**Reasons for Request:** This proposal is the result of the recent active discussion among regulators on this matter.

**Background:** Traditionally a requirement of Rule 4-028(1) of the CEC, Part I - to identify an insulated neutral conductor by a white or natural gray covering for conductor up to and including No. 2 AWF was interpreted consistently and uniformly by the industry and as such a continuous white (or natural gray) colored jacket was expected on the cable by the installers and regulators.

However, in light of the problems related to insulation deterioration on the cables exposed to UV when installed outdoors, manufacturers have produced a cable (ALCAN TRISTRIPE RW90) with black insulation that provides protection against UV exposure.

Three stripes on this black jacket are intended to maintain necessary color coding. When this cable is used as a neutral conductor, the CE Code required identification was intended by the manufacturer to be provided by continuous white stripes on black insulation along the entire length of the cable. Although the intent for this product was to be used in outdoor installations, where protection from UV exposure is necessary, this cable found its application in a variety of other installations (in raceways, in certain types of cable trays, etc.).

However, many regulators expressed concerns in accepting this cable as they feel that three white stripes on a black jacket may confuse installers and this cable may be inadvertently connected to the "hot" terminals. It was felt that explanatory Note could be helpful to clarify the requirement of Rule 4-028(1) for "white covering".

Accordingly, Spec 38 could be also cleaned up to be consistent with this Part I clarification.

**Chair's Comments:** I am in favour of the proposal.

### **Subcommittee Deliberations:**

There were 7 affirmative responses, 3 with comments, and 3 negatives. There is consensus on this issue, in my view, particularly as one of the negative responses showed support for the concept, but favoured changes in the rule itself rather than the appendix.

A summary of comments accompanying affirmative votes is as follows:

**1. a)** Preference to change the rule as well as the Appendix B note to use the word "finish" rather than "covering".

(Chair's note- A change to the rule is not precluded as an item of future business, but it seems reasonable to break this process down into two steps rather than carry them out as one proposal. And the submission is the prerogative of the submitter, who preferred it this way. The term "finish" is one of the options in a future rewording of the clause, rather than to continue the use of the word "covering", but if the rule wording stays the same the Appendix B note should be consistent in its wording with the rule.)

**b)** Subrule 4 seems to differentiate between marking and covering.

(Chair's note- This is true, but the words of the rule link them together, as two separate options to the same end, i.e. identification. But this really pertains to issues outside of Rule 4-028(1), i.e., 4-028(4) and 4-030 and is not strictly related to the subject.)

**c)** For the record, I'd like to amend the proposal to Section 4 S/C by adding a second part to read: Upon adoption of the S/C recommendation - to add appendix B Note on Rule 4-028(1) - to recommend that the S/C on C22.2 No. 38 would consider the amendment to Article 4.4.1.1 by adding a new sentence (proposal to amend CSA std.C22.2.No.38 followed the comment)

(Chair's note:- Amendments to Std. C22.2.No.38 may be in order. Strictly speaking, we don't know the full extent of the possible Std. 38 amendments until the issue is settled at Part I, so any Part II action should be deferred pending the disposition of this item.)

**d)** A position in common with (c) was expressed, seeking Part II solutions.

Comments accompanying negative positions are as follows:-

**e)** Concern that the insulation must be black, when this should apply only for outdoor use.

(Chair's note:- In fact the proposal only confines itself to a single case of what is permitted. Other cases are permissible, outside of black with white stripes, but the proposal simply does not address those other cases.)

**f)** Seeks a wording that for the CEC which is compatible with draft CANENA standards as they stand at present.

(Chair's note:- In fact this is an issue in which the code recognition must come first, then we can seek the appropriate changes, if needed, to the product standards. It does not seem as if extruded stripes conflict with the present CANENA drafts, in fact.)

**g)** A preference was expressed for changing the rule rather than providing the Appendix B clarification, as Appendix B notes can lead to confusion and rejection of a product in the field.

(See Chair's reponse to (a). The Appendix B note as proposed offers a clarification, which ought to eliminate confusion, not propagate it. This proposal seems pretty clear as to its intent. Leaving the subject of extruded stripes without comment has lead to confusion, which was the motivation to introduce the clarification!)

**h)** Comments in common with g) and a) were expressed. The member thought that would bring a level of confusion which would increase as more manufacturers made the product, since he considered the note to be contradicting the rule.

(Chair's note:- See my comments to a) and g). There may be a certain degree of adjustment which is necessary for any innovation, and initial confusion may last until the new convention becomes accepted. Products featuring multiple extruded stripes are wide-spread in the United States, where familiarity has created a higher level of clarity rather than of confusion.)

i) There was comment as to the use of the word "covering" being different from "white stripes".  
(Chair's note:- It is correct that the word "covering" is used in the subject rule. There are different opinions as to whether extruded stripes distributed around the insulation circumference can be interpreted as a covering, and this has spawned a number of comments, as well as a separate request for interpretation under Subject 3051. There is no Part I definition to fall back on. The member has a clear opinion on this, but others disagree, so the jury is out on that issue. )

j) One member was concerned about unsafe consequences with extruded stripes due to confusion, as "people do not always read explanatory notes."

(Chair's note:- I note that extruded stripes are now in the NEC. I find it hard to accept that Canadian installers are more likely than Americans to be confused, or that we Canadians can accept a risk in sizes above 2 AWG under Rule 4-030 that we cannot accept for sizes from 8-2 AWG under 4-028(1), or that armoured cables with this feature are not hazardous, but RW90 in raceway is, when those same insulated conductors are used in armoured cables to connect to the same neutral bar within the same enclosure.)

**Subcommittee Recommendation:** Support the proposal without amendment and proceed to letter ballot.