

Underground systems



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Preface

This is the fourth edition of CSA C22.3 No. 7, *Underground systems*, one of a series of Standards issued under the *Canadian Electrical Code, Part III*. It supersedes the previous editions published in 2006, 1994, and 1986.

This edition includes the following major changes:

- (a) the definitions have been updated;
- (b) resources for the design of underground supply systems ≥ 69 kV are identified in an informative annex ([Annex A](#));
- (c) criteria have been developed related to the separation of underground supply and communication systems from light rail systems;
- (d) criteria related to railway crossings and longitudinal cable installations along railway rights-of-way have been refined;
- (e) requirements for submarine cable installations are included;
- (f) grounding requirements are specified;
- (g) design considerations related to seismic events are specified;
- (h) the overall structure of the Standard and many existing requirements of the Standard have been updated. Informative statements now appear as notes rather than in the main text of various clauses;
- (i) requirements related to clearances, separations, and depth of burial are presented in several tables; and
- (j) an informative annex on directional boring ([Annex E](#)) is provided.

This Standard was prepared by the Technical Committee on Underground Construction, under the jurisdiction of the Strategic Steering Committee on Power Engineering and Electromagnetic Compatibility, and has been formally approved by the Technical Committee. It will be submitted to the Standards Council of Canada for approval as a National Standard of Canada.

March 2010

Notes:

- (1) Use of the singular does not exclude the plural (and vice versa) when the sense allows.
- (2) Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.
- (3) This publication was developed by consensus, which is defined by CSA Policy governing standardization — Code of good practice for standardization as “substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity”. It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this publication.
- (4) CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee.
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 - (b) provide an explanation of circumstances surrounding the actual field condition; and
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C22.3 No. 7-10

Underground systems

1 Scope

1.1

This Standard applies to the lines and equipment associated with underground electric supply and communication systems located entirely outside buildings and fenced supply stations.

See CAN/CSA-C22.3 No. 61936-1 for installations within fenced or indoor supply stations.

1.2

Existing installations, including maintenance replacements, additions, and alterations, meeting the original designs that currently comply with prior editions of this Standard need not be modified to comply with this edition of the Standard, except as might be required for safety reasons by the authority having jurisdiction.

1.3

This Standard, which forms part of the *Canadian Electrical Code, Part III*, covers the requirements for construction of underground systems and includes electric supply and communication circuits that are installed alone, in joint use, or in proximity to each other or other facilities, and that

- (a) cross each other or other facilities;
- (b) cross under railways or highways; or
- (c) run under ground likely to be traversed by vehicles or pedestrians.

1.4

The requirements of this Standard do not constitute complete construction specifications but stipulate the minimum design requirements with regard to

- (a) safety to persons;
- (b) continuity of service; and
- (c) protection of property.

1.5

The selection, design, and installation of supply transmission cables (≥ 69 kV) are not addressed in this Standard.

1.6

Conditions not covered by this Standard are governed by equivalent Standards in common use or by the authority having jurisdiction.

1.7

In some cases, requirements are written for specific types of construction. This does not preclude the use of other types of construction arising out of continuing advancements in the field provided that engineering representatives can demonstrate the safety and suitability of these alternatives.

1.8

The use of terms such as “where practical” is not intended to provide an opportunity for not meeting the minimum requirements of this Standard. When an alternative is not specified, the engineering solution that most closely approximates the preferred method is to be used.