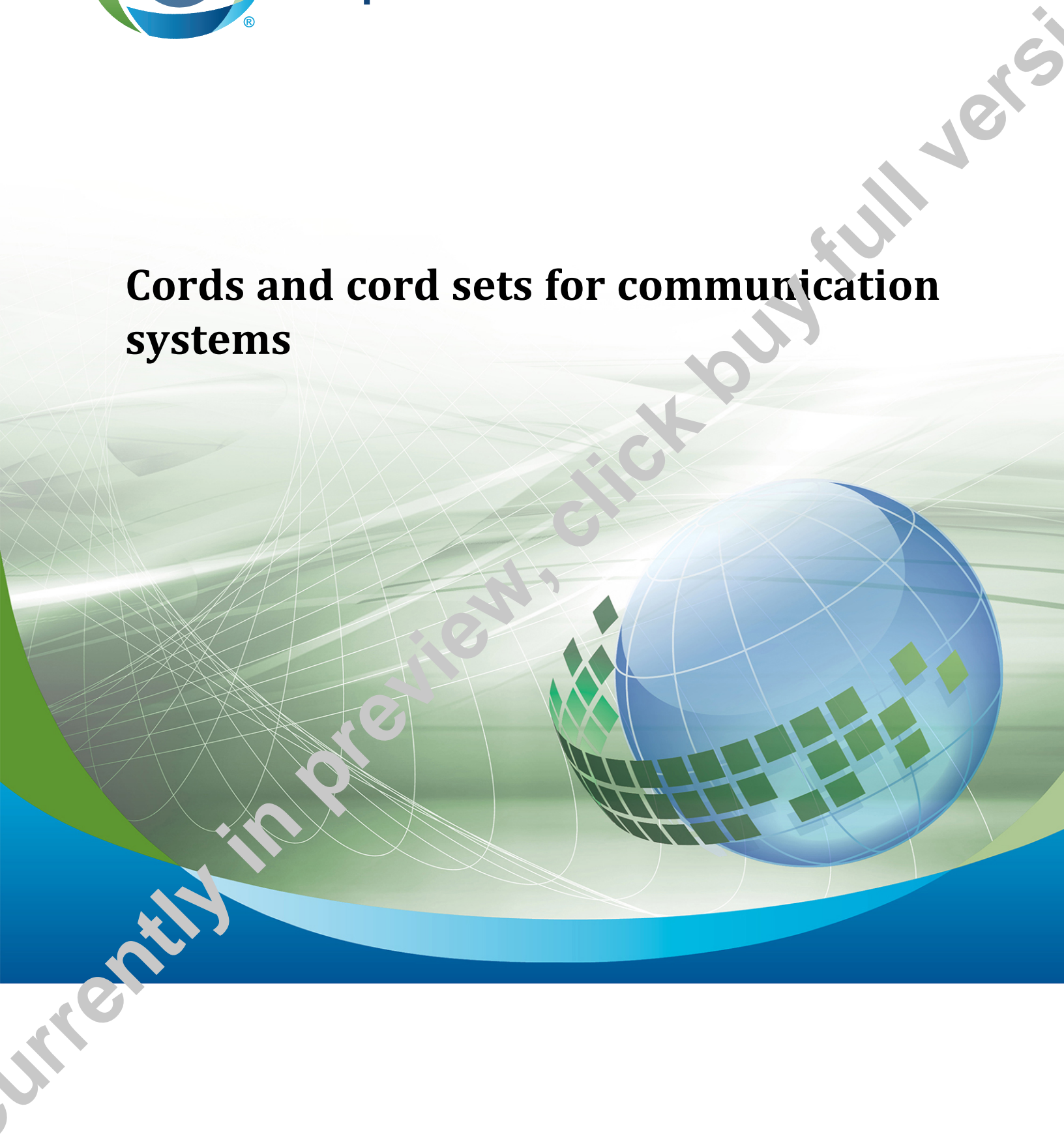




**CSA
Group**

C22.2 No. 233-17

Cords and cord sets for communication systems



Legal Notice for Standards

Canadian Standards Association (operating as “CSA Group”) develops standards through a consensus standards development process approved by the Standards Council of Canada. This process brings together volunteers representing varied viewpoints and interests to achieve consensus and develop a standard. Although CSA Group administers the process and establishes rules to promote fairness in achieving consensus, it does not independently test, evaluate, or verify the content of standards.

Disclaimer and exclusion of liability

This document is provided without any representations, warranties, or conditions of any kind, express or implied, including, without limitation, implied warranties or conditions concerning this document’s fitness for a particular purpose or use, its merchantability, or its non-infringement of any third party’s intellectual property rights. CSA Group does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA Group makes no representations or warranties regarding this document’s compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA GROUP, ITS VOLUNTEERS, MEMBERS, SUBSIDIARIES, OR AFFILIATED COMPANIES, OR THEIR EMPLOYEES, DIRECTORS, OR OFFICERS, BE LIABLE FOR ANY DIRECT, INDIRECT, OR INCIDENTAL DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES, HOWSOEVER CAUSED, INCLUDING BUT NOT LIMITED TO SPECIAL OR CONSEQUENTIAL DAMAGES, LOST REVENUE, BUSINESS INTERRUPTION, LOST OR DAMAGED DATA, OR ANY OTHER COMMERCIAL OR ECONOMIC LOSS, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), OR ANY OTHER THEORY OF LIABILITY, ARISING OUT OF OR RESULTING FROM ACCESS TO OR POSSESSION OR USE OF THIS DOCUMENT, EVEN IF CSA GROUP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA Group is not undertaking to render professional or other services for or on behalf of any person or entity or to perform any duty owed by any person or entity to another person or entity. The information in this document is directed to those who have the appropriate degree of experience to use and apply its contents, and CSA Group accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA Group is a private not-for-profit company that publishes voluntary standards and related documents. CSA Group has no power, nor does it undertake, to enforce compliance with the contents of the standards or other documents it publishes.

Intellectual property rights and ownership

As between CSA Group and the users of this document (whether it be in printed or electronic form), CSA Group is the owner, or the authorized licensee, of all works contained herein that are protected by copyright, all trade-marks (except as otherwise noted to the contrary), and all inventions and trade secrets that may be contained in this document, whether or not such inventions and trade secrets are protected by patents and applications for patents. Without limitation, the unauthorized use, modification, copying, or disclosure of this document may violate laws that protect CSA Group’s and/or others’ intellectual property and may give rise to a right in CSA Group and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by treaty or by law, CSA Group reserves all intellectual property rights in this document.

Patent rights

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. CSA Group shall not be held responsible for identifying any or all such patent rights. Users of this standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.

Authorized use of this document

This document is being provided by CSA Group for informational and non-commercial use only. The user of this document is authorized to do only the following:

If this document is in electronic form:

- load this document onto a computer for the sole purpose of reviewing it;
- search and browse this document; and
- print this document if it is in PDF form.

Limited copies of this document in print or paper form may be distributed only to persons who are authorized by CSA Group to have such copies, and only if this Legal Notice appears on each such copy.

In addition, users may not and may not permit others to

- alter this document in any way, or remove this Legal Notice from the attached standard;
- sell this document without authorization from CSA Group; or
- make an electronic copy of this document.

If you do not agree with any of the terms and conditions contained in this Legal Notice, you may not load or use this document or make any copies of the contents hereof, and if you do make such copies, you are required to destroy them immediately. Use of this document constitutes your acceptance of the terms and conditions of this Legal Notice.



Standards Update Service

C22.2 No. 233-17

May 2017

Title: *Cords and cord sets for communication systems*

To register for e-mail notification about any updates to this publication

- go to shop.csa.ca
- click on **CSA Update Service**

The **List ID** that you will need to register for updates to this publication is **24250-2**

If you require assistance, please e-mail techsupport@csagroup.org or call 416-747-2233.

Visit CSA Group's policy on privacy at www.csagroup.org/legal to find out how we protect your personal information.

C22.2 No. 233-17
***Cords and cord sets for
communication systems***



®A trademark of the Canadian Standards Association, operating as "CSA Group"

*Published in May 2017 by CSA Group
A not-for-profit private sector organization
178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*

*To purchase standards and related publications, visit our Online Store at shop.csa.ca
or call toll-free 1-800-463-6727 or 416-747-4044.*

ISBN 978-1-4883-0710-2

© 2017 CSA Group

*All rights reserved. No part of this publication may be reproduced in any form whatsoever
without the prior permission of the publisher.*

Contents

Technical Committee on Wiring Products	3
Subcommittee on Control, Instrument, Communication, and Marine Cables	5
Preface	8
1 Scope	10
2 Reference publications	10
3 Definitions	11
4 General requirements	11
5 Construction of communication cords	12
5.1 General	12
5.2 Conductors	12
5.3 Insulation	12
5.4 Conductor identification	12
5.5 Assembly of conductors	12
5.6 Shields	12
5.7 Drain wire	12
5.8 Jacket	12
6 Tests on communication cords	12
6.1 Flammability	12
6.1.1 FT1 flame test	12
6.1.2 FT4 flame test	13
6.2 Electrical continuity of conductors	13
6.3 Dielectric strength	13
6.4 Thermal aging	13
6.4.1 Jacket	13
6.4.2 Insulation	13
6.5 Cold bend	14
6.6 Resistance of conductors	14
6.7 Fire hazard test	14
6.8 Abrasion resistance	14
6.9 Insulation shrinkback	15
6.10 Break strength of cord	15
6.11 Mechanical damage — Crushing	15
6.11.1 General	15
6.11.2 Requirement	15
6.11.3 Apparatus	15
6.11.4 Test procedure	15
7 Marking of communication cords	16
7.1 Marking on product	16

7.2 Marking on package 16

8 Construction of communication cord sets 16

9 Tests on communication cord sets 16

9.1 Dielectric strength 16

9.2 Strain relief devices 17

9.3 Pull strength of wire terminations (spade tips, etc.) 17

10 Marking of communication cord sets 17

10.1 Marking on product 17

10.2 Marking on package 17

Annex A (informative) — Suggested colour code and assembly for communication cords (see
Clause 5.4) 19

Technical Committee on Wiring Products

K.L. Rodel	Hubbell Canada LP, Pickering, Ontario <i>Category: Producer Interest</i>	<i>Chair</i>
P. Desilets	Leviton Manufacturing of Canada Limited, Pointe-Claire, Québec <i>Category: Producer Interest</i>	<i>Vice-Chair</i>
W.J. Burr	Burr and Associates, Campbell River, British Columbia <i>Category: General Interest</i>	
C. Davis	Electro Cables Incorporated, Trenton, Ontario <i>Category: Producer Interest</i>	
S.W. Douglas	International Association of Electrical Inspectors (IAEI), Toronto, Ontario <i>Category: General Interest</i>	
D. Drysdale	Nexans Canada Inc., Milton, Ontario <i>Category: Producer Interest</i>	
R.W. Horner	Atkore International (Allied Tube & Conduit Corporation), Harvey, Illinois, USA <i>Category: Producer Interest</i>	
R.J. Kelly	Government of Nunavut-Department of Community & Government Services, Iqaluit, Nunavut <i>Category: Regulatory Authority</i>	
G. Montminy	Régie du bâtiment du Québec, Québec, Québec <i>Category: Regulatory Authority</i>	
T. Ciechna	Electrical Safety Authority, Mississauga, Ontario <i>Category: Regulatory Authority</i>	

Subcommittee on Control, Instrument, Communication, and Marine Cables

D. Drysdale	Nexans Canada Inc., Milton, Ontario	<i>Chair</i>
S.P. Hawkins	Deca Cables Inc., Trenton, Ontario	<i>Vice-Chair</i>
D.M. Campbell	AFC Cable Systems, Inc., New Bedford, Massachusetts, USA	
S. Cho	Shawflex A Division of ShawCor Ltd., Toronto, Ontario	
E. Cometa	CSA Group, Toronto, Ontario	
J. Conrad	RSCC Wire & Cable LLC, East Granby, Connecticut, USA	
W.F. Constantine	Draka Cableteq USA, North Dighton, Massachusetts, USA	
W.A. Crawford	The Okonite Company, Ramsey, New Jersey, USA	
J. Crossman	Domach Inc., Trenton, Ontario	
A. Dabulla	RSCC Wire & Cable LLC, East Granby, Connecticut, USA	
C. Davis	Electro Cables Incorporated, Trenton, Ontario	
P.V. Donovan	Deca Cables Inc., Trenton, Ontario	
G.L. Dorna	Belden Wire & Cable Company Engineering Center, Richmond, Indiana, USA	

D. Harris	Northern Cables Inc., Brockville, Ontario
B. Iyer	Lake Cable, LLC, Bensenville, Illinois, USA
J. Johnson	Electro Cables Incorporated, Trenton, Ontario
D.B. Kiddoo	Communications Cable & Connectivity Association (CCCA), Phoenix, Maryland, USA
R. Kummer	Southwire Company, Carrollton, Georgia, USA
P. Laudicina	Nexans AmerCable, Houston, Texas, USA
M.R. Levitre	Southwire Company, Carrollton, Georgia, USA
A. McInnes	PolyOne Canada, Inc., Orangeville, Ontario
N. Moubed	Anixter Canada Inc., Mississauga, Ontario
I. Muller	Nexans Canada Inc., Markham, Ontario
S. Murali	General Cable Industries, Inc., Willimantic, Connecticut, USA
K. Patel	PolyOne Corporation, Centerville, Ohio, USA
R. Pavluk	United Wire & Cable Incorporated, Richmond Hill, Ontario
T. Rudd	Shawflex A Division of ShawCor Ltd., Toronto, Ontario

J. Schroeder	General Cable Industries, Inc., Willimantic, Connecticut, USA	
J. Singh	Domtech Inc., Trenton, Ontario	
M. Sparano	Gendon Polymer Services Inc., Bolton, Ontario	
G.A. Straniero	AFC Cable Systems, Inc., Freehold, New Jersey, USA	
A.Z. Tsisserev	AES Engineering, Vancouver, British Columbia	
J. Turner	Swansea Consulting, Toronto, Ontario	
D. Verhage	Domtech Inc., Trenton, Ontario	
C.D. White	Southwire Co., Carrollton, Georgia, USA	
J. Willner	Bolton, Ontario	
A. Popa	CSA Group, Toronto, Ontario	<i>Project Manager</i>

Preface

This is the third edition of CSA C22.2 No. 233, *Cords and cord sets for communication systems*, issued by CSA Group under Part II of the *Canadian Electrical Code*. It supersedes the previous editions published in 2009 and 1989.

For general information on the Standards of the *Canadian Electrical Code, Part II*, see the preface of the latest issue of CSA C22.2 No. 0, *General Requirements — Canadian Electrical Code, Part II*.

Changes to this edition include the following:

- a) In Clause 6.1.1, the FT1 marking is now mandatory for cords meeting the FT1 requirements.
- b) References to the testing standard, CSA C22.2 No 0.3, have been changed to the recently published harmonized standard, CSA C22.2 No 2556.
- c) Clause 7.1 emphasizes that fire rating marking is optional to indicate that the coiled cord does not require fire rating.

This Standard is considered suitable for conformity assessment within the stated scope of the Standard.

This Standard was prepared by the Subcommittee on Control, Instrument, Communication, and Marine Cables, under the jurisdiction of the Technical Committee on Wiring Products and the Strategic Steering Committee on Requirements for Electrical Safety, and was formally approved by the Technical Committee.

Interpretations: The Strategic Steering Committee on Requirements for Electrical Safety has provided the following direction for the interpretation of standards under its jurisdiction: “The literal text shall be used in judging compliance of products with the safety requirements of this Standard. When the literal text cannot be applied to the product, such as for new materials or construction, and when a relevant CSA committee interpretation has not already been published, CSA Group’s procedures for interpretation shall be followed to determine the intended safety principle.”

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 Standard 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 Standard.*
- 4) *To submit a request for interpretation of this Standard, please send the following information to inquiries@csagroup.org and include “Request for interpretation” in the subject line:*
 - a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
 - b) *provide an explanation of circumstances surrounding the actual field condition; and*
 - c) *where possible, phrase the request in such a way that a specific “yes” or “no” answer will address the issue.*

Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are available on the Current Standards Activities page at standardsactivities.csa.ca.
- 5) *This Standard is subject to review five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include “Proposal for change” in the subject line:*
 - a) *Standard designation (number);*
 - b) *relevant clause, table, and/or figure number;*

- c) *wording of the proposed change;*
- d) *rationale for the change.*

C22.2 No. 233-17

Cords and cord sets for communication systems

1 Scope

1.1

This Standard applies to cords and cord sets intended for indoor use to electrically connect communication systems that have a normal operating voltage-to-ground of less than 150 V, and that are installed or used in accordance with the Rules of the *Canadian Electrical Code, Part I*.

1.2

This Standard applies to single-, paired-, and multi-conductor cords, as well as cord sets, where no part of the cord is subjected to a temperature exceeding 60 °C.

1.3

This Standard does not apply to

- a) cords and cord sets that contain conductors other than those used specifically for communications circuits, such as electric light, power, Class I, and Class II circuit conductors (as defined in the *Canadian Electrical Code, Part I*); or
- b) cords or cord sets covered by CSA C22.2 No. 21.

1.4

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below:

CSA Group

C22.1-15

Canadian Electrical Code, Part I