



Cord sets and power-supply cords



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.



Revision History

C22.2 No. 21-18, Cord sets and power-supply cords

Errata — June 2020	Revision symbol (in margin)
Clauses 1.6 and 1.8	Δ

Currently in preview, click buy full version

Standards Update Service

C22.2 No. 21-18
November 2018

Title: *Cord sets and power-supply cords*

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

- go to store.csagroup.org
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **24263-1**

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.

Canadian Standards Association (operating as “CSA Group”), under whose auspices this National Standard has been produced, was chartered in 1919 and accredited by the Standards Council of Canada to the National Standards system in 1973. It is a not-for-profit, nonstatutory, voluntary membership association engaged in standards development and certification activities.

CSA Group standards reflect a national consensus of producers and users — including manufacturers, consumers, retailers, unions and professional organizations, and governmental agencies. The standards are used widely by industry and commerce and often adopted by municipal, provincial, and federal governments in their regulations, particularly in the fields of health, safety, building and construction, and the environment.

Individuals, companies, and associations across Canada indicate their support for CSA Group’s standards development by volunteering their time and skills to Committee work and supporting CSA Group’s objectives through sustaining memberships. The more than 7000 committee volunteers and the 2000 sustaining memberships together form CSA Group’s total membership from which its Directors are chosen. Sustaining memberships represent a major source of income for CSA Group’s standards development activities.

CSA Group offers certification and testing services in support of and as an extension to its standards development activities. To ensure the integrity of its certification process, CSA Group regularly and continually audits and inspects products that bear the CSA Group Mark.

In addition to its head office and laboratory complex in Toronto, CSA Group has regional branch offices in major centres across Canada and inspection and testing agencies in eight countries. Since 1919, CSA Group has developed the necessary expertise to meet its corporate mission: CSA Group is an independent service organization whose mission is to provide an open and effective forum for activities facilitating the exchange of goods and services through the use of standards, certification and related services to meet national and international needs.

For further information on CSA Group services, write to
CSA Group
178 Rexdale Boulevard
Toronto, Ontario, M9W 1R3
Canada

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited Standards Development Organization, in compliance with requirements and guidance set out by SCC. More information on National Standards of Canada can be found at www.scc.ca.

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada’s economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at www.scc.ca.

Standards Council of Canada
600-55 Metcalfe Street
Ottawa, Ontario, K1P 6L5
Canada



Standards Council of Canada
Conseil canadien des normes

Cette Norme Nationale du Canada n’est disponible qu’en anglais.

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 to judge its suitability for their particular purpose.

**A trademark of the Canadian Standards Association, operating as “CSA Group”*

National Standard of Canada

C22.2 No. 21-18

Cord sets and power-supply cords



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



*Published in November 2018 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 store.csagroup.org
or call toll-free 1-800-463-6727 or 416-747-4044.*

*ICS 29.060.10
ISBN 978-1-4883-1555-8*

*© 2018 Canadian Standards Association
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	6
Integrated Committee on Wiring Devices	8
Preface	11
1 Scope	12
2 Reference publications	13
3 Definitions	16
4 General Requirements	18
4.1 General	18
4.2 Components	18
4.3 Units of measurement	19
5 Construction	19
5.1 Fittings — General	19
5.1.1 Configurations and dimensions	19
5.1.2 Flammability	19
5.1.3 Accessibility of live parts	19
5.1.4 Connection to fittings	20
5.1.5 Identification and wiring	20
5.1.6 Treatment of cord-conductor coverings	21
5.1.7 Outdoor-use fittings	21
5.2 Plugs	22
5.2.1 Blades	22
5.2.2 Attachment plug grip	22
5.2.3 Hospital grade attachment plugs	23
5.3 Cord connectors	23
5.3.1 General	23
5.3.2 Holes, indentations, and projections	24
5.3.3 Improper insertion	24
5.3.4 Mismatching	24
5.3.5 Cord connector — Outdoor	25
5.3.7 Hospital grade connectors	25
5.4 Other components	26
5.4.1 General	26
5.4.2 Integral strain relief clamps	26
5.4.3 Switches	26
5.4.4 Switches — Outdoor	27
5.4.5 Current taps and pendant switches	28
5.4.6 Through-cord heating-pad switch	28
5.4.7 Fittings intended to accommodate overcurrent protective devices	28
5.4.8 Overcurrent protection	29
5.4.9 Cord restraint devices	30

- 5.4.10 Supplementary circuit 30
- 5.4.11 Devices employing remote control features 30

6 Assembly 31

- 6.1 Power-supply cords 31
 - 6.1.1 General 31
 - 6.1.2 Attachment to fittings 32
 - 6.1.3 Other components 32
 - 6.1.4 Flexible cord 33
 - 6.1.5 Length 33
 - 6.1.6 Ratings 33
 - 6.1.7 Markings 33
- 6.2 Special-use power-supply cords 34
- 6.3 Recreational vehicle power-supply cords 34
 - 6.3.1 General 34
 - 6.3.2 Flexible cord 34
 - 6.3.3 Plugs 35
- 6.4 Mobile home power-supply cords 35
 - 6.4.1 General 35
 - 6.4.2 Flexible cord 35
 - 6.4.3 Plugs 36
 - 6.4.4 Rating 36
- 6.5 Range and dryer power-supply cords 36
 - 6.5.1 General 36
 - 6.5.2 Attachment plug 36
- 6.6 Range and dryer power-supply cord kits 36
 - 6.6.1 General 36
 - 6.6.2 Flexible cord 37
 - 6.6.3 Length 37
 - 6.6.4 Strain relief 37
 - 6.6.5 Cord push-back relief 37
 - 6.6.6 Termination of conductors 37
- 6.7 Extension cord sets 38
 - 6.7.1 Construction 38
 - 6.7.2 Fittings (indoor and outdoor) 38
 - 6.7.3 Other components 39
 - 6.7.4 Flexible cord 39
 - 6.7.5 Lengths 40
 - 6.7.6 Ratings 40
- 6.8 Adapter cord sets 42
 - 6.8.1 General 42
 - 6.8.2 Fittings 42
 - 6.8.3 Flexible cord 43
 - 6.8.4 Joints 43
 - 6.8.5 Ratings 44
- 6.9 Special-use cord sets 44
 - 6.9.1 General 44
 - 6.9.2 Plugs 45
 - 6.9.4 Flexible cord 45

6.9.5	Length	46
6.9.6	Markings	46
6.10	Vacuum cleaner and floor-finishing machine cord sets	46
6.11	Recreational vehicle cord sets	46
6.12	Hospital grade power-supply cords, extension cords, and cord sets	47
6.12.1	Hospital grade power-supply cords	47
6.12.2	Hospital grade extension cords	47
6.12.3	Hospital grade cord sets	47
6.12.4	Markings	47
6.13	Heater cord sets	48
6.14	Cord sets with appliance plugs	48
6.15	Cord sets with flatiron plugs	48
6.16	Cord sets for appliances rated 50 W or less	48
6.16.1	General	48
6.16.2	Flexible cord	48
6.16.3	Appliance coupler	48
6.16.4	Ratings	49
6.17	Replacement-use with nonstandard polarization	49
6.17.1	General	49
6.17.2	Replacement cord sets	49

7 Performance 49

7.1	Attachment plugs and cord connectors	49
7.1.1	Conductor secureness test	49
7.1.2	Security of insulation test	50
7.1.3	Strain relief test	51
7.1.4	Dielectric voltage-withstand test	53
7.1.5	Insulation resistance test	54
7.1.6	Accelerated aging test	54
7.1.7	Crushing test	55
7.1.8	Impact resistance test	55
7.1.9	Flexing test	56
7.1.10	Jacket retention test	57
7.1.11	Adhesion test	58
7.1.12	Cycling heat test	58
7.2	Tests for attachment plugs	60
7.2.1	Security of blades and pins test	60
7.2.2	Temperature test	60
7.2.3	Plug grip test	61
7.2.4	Blade pull test at elevated temperature	62
7.2.5	Abrupt pull test	63
7.3	Tests for range and dryer power-supply cord kits	65
7.3.1	Strain relief test	65
7.3.2	Accelerated aging test	65
7.3.3	Push-back force test	66
7.3.4	Flexing tests for range and dryer power-supply cord kits	66
7.4	Tests for cord connectors	66
7.4.1	Depth of cavity test	66
7.4.2	Conditioning cycles for blade retention test	67

7.4.3	Retention of blades test	67
7.4.4	Overload test	67
7.4.5	Temperature test	68
7.4.6	Retention of blades test (repeated)	69
7.4.7	Resistance to arcing test	69
7.4.8	Improper insertion test	70
7.4.9	Low-temperature insertion test	70
7.4.10	Closure of openings test	71
7.5	Tests for flatiron and appliance plugs	72
7.6	Tests for overcurrent protective devices	72
7.6.1	General	72
7.6.2	Calibration test	72
7.6.3	Short-circuit tests for all products with overcurrent protection	72
7.6.4	Short-circuit test for fuses	73
7.6.5	Abnormal test	73
7.6.6	Water exclusion test for enclosures of outdoor-use products	74
7.7	Hospital grade molded-on plugs and connectors	74
7.7.1	General	74
7.7.2	Strain relief tests	74
7.7.3	Bonding (grounding) pin retention — Hospital grade cord connector	76
7.7.4	Attachment plug connection and separation — Hospital grade cord connector	76
7.7.5	Grounding contact temperature hospital grade cord connector	77
7.7.6	Bond resistance hospital grade cord connector	77
7.7.7	Crushing hospital grade attachment plug and cord connector	77
7.7.8	Impact hospital grade attachment plug and cord connector	77
7.7.9	Mechanical drop hospital grade attachment plug and cord connector	77
7.8	Tests for cord restraint devices	78
7.8.1	Temperature test	78
7.9	Test for permanence of warning tag	79
7.9.1	Cords other than outdoor type	79
7.9.2	Outdoor-type (W) cords	79
7.9.3	Oil-resistant cords	80
7.9.4	Test procedure	80
7.9.5	Evaluation	80
8	Marking	81
8.1	General	81
8.2	Extension cord sets	82
8.2.1	General	82
8.2.2	Polarization	83
8.2.3	Indoor-use extension cord sets	83
8.3	Outdoor-use extension cord sets	85
8.4	Heater cord sets	85
8.5	Adapter cord sets	85
8.6	Cord restraint devices	85
8.7	Replacement cord sets	85
8.8	Recreational vehicle and mobile home applications	86
8.9	Power-supply cords — Shielded	86
8.10	Hospital grade attachment plugs, connectors and hospital grade extension cords	86

8.11	Range and dryer power-supply cord kits	87
8.12	Power-supply cords for replacement use	87
8.13	Special-use power supply cords	89
8.14	Special-use cord sets	89
8.15	Special use cord sets intended for replacement use	90

Annex A (normative)	— Component standards reference list	157
Annex B (normative)	— Illustrative definitions	158
Annex C (informative)	— Marking translations	159
Annex D (normative)	— Seasonal-use cord sets	162
Annex E (normative)	— Manufacturing and production tests	173
Annex F (normative)	— Marine cord set	175

Preface

This is the tenth edition of CSA C22.2 No. 21, *Cord sets and power supply cords*.

This edition supersedes previous editions published in 2014, 1995, 1990, 1984, 1978, 1960, 1954, 1941, and 1935 and is written in SI (metric) units, except the wire gauge sizes.

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

This Standard was prepared by the Integrated Committee on Wiring Devices, under the jurisdiction of the Technical Committee on Wiring Products and the Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the Technical Committee.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

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 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 within 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; and*
 - d) *rationale for the change.*

C22.2 No. 21-18

Cord sets and power-supply cords

1 Scope

1.1

This Standard specifies the requirements for cord sets and power-supply cords employing molded-on or assembled-on fittings, rated 600 V maximum, and intended for use in non-hazardous locations in accordance with CSA C22.1, *Canadian Electrical Code, Part I*, and CAN/CSA-C22.2 No. 0, *General Requirements—Canadian Electrical Code, Part II*.

1.2

This Standard also specifies the requirements for molded-on general-use attachment plugs and cord connectors.

1.3

This Standard also specifies the requirements for molded-on hospital grade attachment plugs and cord connectors.

1.4

This Standard also specifies the requirements for cord restraint devices.

1.5

These requirements do not cover cord sets intended for temporary outdoor use — not to exceed 90 days — with outdoor equipment, Christmas-tree, and other seasonal decorative-lighting outfits.

Δ 1.6

This Standard does not cover electric vehicle cord sets. Requirements for electric vehicle cord sets are listed in CSA C22.2 No. 280.

1.7

This Standard does not cover cord reels and power bars. Requirements for cord reels and power bars are listed in CSA C22.2 No. 308.

Δ 1.8

This Standard contains the following annexes:

- a) Annex [A](#) — Component standards reference list;
- b) Annex [B](#) — Illustrative definitions;
- c) Annex [C](#) — Canadian marking translations;
- d) Annex [D](#) — Seasonal-use cord sets;
- e) Annex [E](#) — Manufacturing and production tests; and
- f) Annex [F](#) — Marine cord set.