



CSA C22.3 No. 1:20
National Standard of Canada



Overhead systems



scc  ccn

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 format.

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

CSA C22.3 No. 1:20, Overhead systems

Update No. 1 — January 2022	Revision symbol (in margin)
<p>Technical Committee Preface Clauses 1.3, 2, 3.1, 3.2, 4.1.2, 4.1.7.1, 4.1.7.2, 4.1.8, 4.8, 5.2.6.2, 5.2.10, 5.2.11, 5.3.1.1, 5.3.3, 5.3.3.2, 5.3.3.3, 5.3.4, 5.3.4.1, 5.3.4.2, 5.3.4.3, 5.3.5, 5.3.6, 5.6.2, 6.3.2.1, 6.3.3, 7.1, 7.2.1, 7.2.2, 7.2.3, 7.3.1, 7.3.5, 7.5.1, 7.6.2.1, 10, A.4.1.2, A.4.1.7, A.5.2.10, A.5.2.11, A.5.3.1, A.5.3.3, A.5.3.4, A.5.3.5, A.5.3.6, D.1, D.2, D.3, and D.4 Annexes F, G, H, and I Tables 1, 2, 3, 27, 28, 30, 35, 36, 37, A.1, and A.2</p>	①
Administrative update — May 2021	
National Standard of Canada page: French version now available	

Standards Update Service

CSA C22.3 No. 1:20
September 2020

Title: *Overhead systems*

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

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

The **List ID** that you will need to register for updates to this publication is **24281-7**

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.

More than 10 000 members indicate their support for CSA Group’s standards development by volunteering their time and skills to Committee work.

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 fourteen 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



Comité Normalisateur du Canada est disponible en versions française et anglaise.

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

CSA C22.3 No. 1:20 Overhead systems



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



*Published in September 2020 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 www.csagroup.org/store/
or call toll-free 1-800-463-6727 or 416-747-4044.*

*ICS 29.240.20
ISBN 978-1-4883-2957-9*

*© 2020 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 Overhead Systems — Update 1	7
Technical Committee on Overhead Systems	12
Preface	17
1 Scope	19
2 Reference publications	20
3 Definitions and abbreviations	25
3.1 Definitions	25
3.2 Abbreviations	35
4 General requirements	36
4.1 General design and maintenance	36
4.1.1 Multiple requirements	36
4.1.2 Service and operating conditions	36
4.1.3 Accessibility	36
4.1.4 Climbing space	37
4.1.5 Working space	37
4.1.6 Obstruction in climbing space or working space	37
4.1.7 Vegetation management	38
4.1.8 Discontinuous permafrost	38
4.2 Structures and attachments	39
4.2.1 Protection against fires	39
4.2.2 Protection against mechanical damage	39
4.2.3 Insulation of energized conductors attached to structures	39
4.2.4 Risers	39
4.2.5 Protection against climbing	40
4.2.6 Protection against corrosion	40
4.2.7 Grounding and insulating of guys	40
4.2.8 Marking of guys	41
4.2.9 Luminaires, luminaire span, and supply wires	41
4.2.10 Traffic lights	41
4.2.11 Trolley span wires and brackets	42
4.3 Overhead conductors	42
4.3.1 Identification	42
4.3.2 Common neutral	42
4.3.3 All-dielectric self-supporting (ADSS) fibre optic cables	42
4.3.4 Optical groundwire (OPGW)	42
4.4 Coordinated electrical protection	42
4.4.1 Inductive coordination	42
4.4.1.1 Supply and communication circuits	42
4.4.2 Other wire facilities	43
4.4.3 Electromagnetic induction	43

- 4.6 Special rules for communication lines 43
- 4.6.1 Communication lines (including supply circuits used exclusively for the operation of communication circuits) 43
- 4.6.2 Wireless communication antenna 44
- 4.6.3 Communication circuits and communication equipment used exclusively in the operation of supply lines 45
- 4.7 Changes in the vicinity of a line 46
- 4.8 Ice removal management system 46
- 5 Clearances, separations, and spacings 46**
- 5.1 General 46
- 5.2 General application 46
- 5.2.1 Construction and day-to-day clearances 46
- 5.2.2 Vertical design clearances 47
- 5.2.3 Horizontal design clearances 47
- 5.2.4 Conductor classification for clearances 47
- 5.2.5 Conductor temperature for thermal loading conditions 47
- 5.2.6 Communication cables and wires temperature for thermal loading conditions 48
- 5.2.7 Neutral conductors and lightning protection wires 48
- 5.2.8 Wire or conductor swing for horizontal design clearances 48
- 5.2.9 Insulator string swing for clearance calculations — Transmission line structures 48
- 5.2.10 Vegetation management for supply-line conductors under swing — Lines operating at > 70 kV phase-phase 49
- 5.2.11 Vegetation management for supply-line conductors at rest (falling trees) — Lines operating at > 70 kV phase-phase 49
- 5.3 Vertical design clearances and separations 49
- 5.3.1 Vertical design clearances of wires and conductors above ground or rails 49
- 5.3.2 Vertical separations (heights) of supply equipment from ground 50
- 5.3.3 Clearances over waters 51
- 5.3.4 Heights regarding aviation requirements 51
- 5.3.5 Clearances above flood hazard zones 52
- 5.3.6 Vertical separations of exposed supply equipment above flood plains hazard zones 52
- 5.4 Horizontal design clearances of wires and conductors from railway tracks 53
- 5.5 Horizontal separation of supporting structures from railway tracks 53
- 5.6 Horizontal separations of supporting structures from fire hydrants, street corners, curbs, and other buried services 54
- 5.6.1 Horizontal separation from fire hydrants 54
- 5.6.2 Horizontal separation from street corners 54
- 5.6.3 Horizontal separation from curbs 54
- 5.6.4 Horizontal separation from other buried services 54
- 5.7 Clearances and separations of wires, conductors, and equipment from buildings, signs, bridges, swimming pools, and similar plant 54
- 5.7.1 General 54
- 5.7.2 Supply conductors permanently attached to buildings 55
- 5.7.3 Clearances of wires and conductors passing by or over buildings, above-ground pipelines, signs, billboards, lamps, traffic signs, standards, and antennas (not attached) 55
- 5.7.4 Clearances from supply wires and conductors to bridges 56
- 5.7.5 Minimum separation of equipment and clearances of conductors over and adjacent to swimming pools 57

- 5.7.6 Horizontal separations from supply equipment to buildings 57
- 5.7.7 Clearances and separations from natural gas and propane equipment 57
- 5.7.8 Clearances from other flammable hazards 58
- 5.7.9 Clearances for other wire facilities 58
- 5.7.10 Clearance from irrigation systems — Lines operating at > 66 kV 58
- 5.8 Clearances between wires and conductors of one line and wires, conductors, and structures of another line 58
 - 5.8.1 Vertical clearances at crossings of line wires and conductors supported by different structures 58
 - 5.8.2 Clearances between conductors supported by different structures but not crossing each other 59
 - 5.8.3 Clearances in any direction between conductors of one line and supporting structures of another line 59
 - 5.8.4 Conductors energized at 230 kV phase-to-phase or greater 60
- 5.9 Separations of supply-line conductors and conductor supports on the same supporting structure 60
 - 5.9.1 Horizontal separations or separations within 45° of the horizontal of supply-line conductors on the same supporting structure 60
 - 5.9.2 Vertical separations and clearances of supply-line conductors attached to the same supporting structure 61
 - 5.9.3 Separations in any direction other than horizontal or vertical between supply-line conductors 61
 - 5.9.4 Clearances in any direction from communication-line conductors to guys, span wires, or grounding conductors carried in aerial spans and attached to the same supporting structure 62
 - 5.9.5 Separations or clearances in any direction from supply conductors to other supply plant attached to the same supporting structure 62
- 5.10 Joint-use clearances and separations — Supply and communication plant 62
 - 5.10.1 Vertical separations at the structure — Normal level arrangement 62
 - 5.10.2 Vertical separations at the structure — Inverted level arrangement 63
 - 5.10.3 In-span vertical clearances 63
 - 5.10.4 Vertical runs attached to surface of structure 64
 - 5.10.5 Vertical runs not attached to surface of structure 64
 - 5.10.6 Clearances and separations between drops and service conductors on buildings 64
- 5.11 Guys and guy attachments 65
 - 5.11.1 Guy attachments to joint-use structures 65
 - 5.11.2 Guys attached to joint-use structures 65
 - 5.11.3 Guys attached to remote structures 65
 - 5.11.4 Guys attached above current-carrying supply plant 65
- 6 Minimum grades of construction 66**
 - 6.1 General 66
 - 6.2 Order of grades 66
 - 6.3 Minimum grades of construction 66
 - 6.3.1 General 66
 - 6.3.2 Crossings 66
 - 6.3.3 Proximities 66
 - 6.3.4 Joint-use 66
 - 6.4 Insulated cabled supply conductors 67

6.5 Multiple crossings 67

7 Weather loads and assumed loads according to deterministic design methods 67

7.1 General 67

7.2 Weather loads 67

7.2.1 General 67

7.2.2 Weather category method 68

7.2.3 Historical weather method 68

7.3 Assumed loads for wire and cable attachments 68

7.4 General requirements — Loads on supports 69

7.5 Assumed vertical load on supports 70

7.5.1 General 70

7.5.2 Assumed vertical load on wood, concrete, and fibre-reinforced composite poles, metal structures, and towers 70

7.5.3 Assumed vertical load on crossarm assemblies, pins, posts, insulators, and fastenings 70

7.6 Assumed transverse load on supports 70

7.6.1 Assumed transverse load due to wind pressure on wire and cable attachments 70

7.6.2 Assumed transverse load on a structure 70

7.6.3 Assumed transverse load on pins, posts, insulators, and fastenings 71

7.6.4 Assumed transverse load on wood, concrete, and fibre-reinforced composite poles, metal structures, towers, and guys 71

7.7 Assumed loads on supports at angles 71

7.7.1 General 71

7.7.2 Assumed loads at angles on wood, concrete, and fibre-reinforced composite poles, metal structures, towers, and guy assemblies 72

7.7.3 Assumed loads at angles on crossarms, pins, posts, insulators, and fastenings 72

7.8 Assumed longitudinal loads on supports 72

7.8.1 Assumed longitudinal load — Terminations or tension changes: Grades 1, 2, and 3 72

7.8.2 Assumed longitudinal load — Without terminations or tension changes 73

7.9 Assumed loads on a common structure 74

8 Strength of supporting systems according to deterministic design methods 74

8.1 General 74

8.2 Materials 75

8.3 Strength of supports 75

8.3.1 Structures — All grades 75

8.3.2 Vertical pull due to changes in elevation 75

8.3.3 Spliced wood poles 75

8.3.4 Stub-reinforced poles 76

8.3.5 Pole top supports and pole top pins or posts 76

8.3.6 Pole mounts 76

8.3.7 Special wood structures 76

8.3.8 Wood poles 76

8.3.9 Concrete poles 76

8.3.10 Metal poles, metal towers, and metal supports 76

8.3.11 Foundations and settings 77

8.3.12 Fibre-reinforced composite poles 77

8.4 Guys, guy assemblies, and braces 77

8.4.1 Application of guys 77

8.4.2	Installation of anchorages	78
8.4.3	Side-guyed structures — Grades 1, 2, and 3	78
8.4.4	Head-guyed structures	78
8.4.5	Longitudinal guying requirements for combinations of messenger cable and wire at crossings	79
8.5	Crossarms, pins, posts, and fastenings — Grades 1, 2, and 3	79
8.5.1	Strength	79
8.5.2	Strength of crossarms	79
8.6	Strength of insulators	80
8.6.1	Pin-type and post-type insulators	80
8.6.2	Suspension-type insulators	80
8.7	Supply conductors, supporting conductors, and messengers	80
8.7.1	Materials	80
8.7.2	Minimum rated strength — Grade 1	80
8.7.3	Wire tension limits	80
8.8	Lightning protection wires	81
8.8.1	General	81
8.8.2	Galvanized steel wire strand	81
8.9	Trolley contact conductors	81
8.10	Supply cables — Grades 1, 2, and 3	81
8.11	Communication conductors and cables — Grades 1, 2, and 3	81
8.11.1	Grade 3	81
8.11.2	Material — Grades 1 and 2	82
8.11.3	Sags and tensions	82
8.11.4	Communication conductors crossing over supply lines	82
8.12	Communication drops and cables — Grades 1 and 2	82
8.12.1	Communication drops and cables supported by messengers	82
8.12.2	Communication drops or cables not supported by messengers — Grades 1 and 2	82
8.13	Communication cables and messengers	82
8.13.1	Communication cables	82
8.13.2	Messengers	82
8.14	Supply and communications — Messenger clamps and fastenings: Grades 1, 2, and 3	83
8.15	Supply and communications — Cable attachments to suspension strand: Grades 1, 2, and 3	83
8.15.1	General	83
8.15.2	Cable attachments at railway crossings	83
8.16	Splices at crossings — Grade 1	83
8.17	In-span taps at crossings — Grades 1 and 2	83
8.17.1	Supply conductors greater than 750 V	83
8.17.2	Supply conductors of 0 to 750 V and communication conductors	84
8.18	Supply-line insulators	84
8.18.1	General	84
8.18.2	Selection of insulators	84
8.18.3	Protection against arcing	84
8.19	Communication and power line hardware	84

9 Grounding methods for supply systems less than or equal to 22 kV and communications facilities 84

9.1	Supply systems less than or equal to 22 kV	84
-----	--	----

9.1.1	Conductors	84
9.1.2	Ground resistance requirements	85
9.1.3	Ground electrodes and connections	86
9.1.4	Mechanical protection of supply grounding conductors mounted on exterior of the pole	86
9.1.5	Non-conducting covering for supply grounding conductors	87
9.1.6	Interconnecting ground electrodes and grids	87
9.1.7	Grounding metal and concrete poles	87
9.1.8	Non-current-carrying items of supply equipment	87
9.1.9	Grounding lightning arresters	87
9.1.10	Grounding pole-mounted equipment	87
9.1.11	Gang-operated switches	87
9.1.12	Ground interconnections	88
9.1.13	Grounding of riser pipes and guards	88
9.1.14	Grounding conductors on joint-use structures	88
9.2	Grounding and bonding of communications facilities	88
9.2.1	General	88
9.2.2	Grounding and bonding intervals — Aerial non-joint-use	89
9.2.3	Grounding and bonding intervals — Aerial joint-use: copper cables	89
9.2.4	Grounding and bonding intervals — Aerial joint-use: fibre cables	90
9.2.5	Grounding and bonding in the zone of influence of a substation	90
9.2.6	Bonding and grounding with joint-use on earth return and ungrounded (delta) supply systems	90
9.2.7	Non-current-carrying items of communication equipment	90

10 Reliability-based design method 90

Annex A (informative)	— Commentary	127
Annex B (informative)	— Stress-strain characteristics and conductor sag	192
Annex C (informative)	— Loading maps	196
Annex D (informative)	— Climatic data for selected locations	201
Annex E (informative)	— Covered conductor bundled system (also known as spaced aerial cable system)	240
Annex F (informative)	Transmission electrostatic induction clearance calculation	243
Annex G (informative)	Considerations regarding the design of transmission infrastructure in discontinuous permafrost	254
Annex H (informative)	Ice removal management system	262
Annex I (informative)	— Bibliography	274

① **Technical Committee on Overhead Systems — Update 1**

J. A. McFadgen	Nova Scotia Power Inc., Halifax, Nova Scotia, Canada <i>Category: Electricity Distribution Interest</i>	<i>Chair</i>
S. Cumminger	Sonideft Inc., Middle Sackville, Nova Scotia, Canada <i>Category: Carriers</i>	<i>Vice-Chair</i>
A. Afshar	Hydro One Networks Inc., Toronto, Ontario, Canada	<i>Non-voting</i>
I. Albanese	TELUS, Burnaby, British Columbia, Canada	<i>Non-voting</i>
A. BalasoIU	Hydro-Québec, Distribution, Montréal, Québec, Canada	<i>Non-voting</i>
M. D. Bell	Hydro One Networks Inc., Toronto, Ontario, Canada <i>Category: Electricity Distribution Interest</i>	
R. B. Bonin	Transport Canada, Québec, Quebec, Canada	<i>Non-voting</i>
E. Chan	Ontario Ministry of Labour, Training and Skills Development, Toronto, Ontario, Canada	<i>Non-voting</i>
F. Dennert	British Columbia Hydro, Burnaby, British Columbia, Canada <i>Category: Electricity Distribution Interest</i>	
M. Dziurda	Synergy North, Thunder Bay, Ontario, Canada	<i>Non-voting</i>
F. Fahmy	Railway Association of Canada, Ottawa, Ontario, Canada	<i>Non-voting</i>
L. Gallagher	Utilities Standards Forum, Guelph, Ontario, Canada	<i>Non-voting</i>

T. Gardiner	Newfoundland and Labrador Hydro, St. John's, Newfoundland and Labrador, Canada	<i>Non-voting</i>
E. Ghannoum	Montréal, Québec, Canada <i>Category: General Interest</i>	
E. Halilovic	Toronto Hydro-Electric System LTD, Toronto, Ontario, Canada	<i>Non-voting</i>
I. Hathout	Mississauga, Ontario, Canada <i>Category: General Interest</i>	
J. Hrycyshyn	Electrical Safety Authority, Mississauga, Ontario, Canada <i>Category: General Interest</i>	
M. F. Ishac	Self Employed, Toronto, Ontario, Canada <i>Category: General Interest</i>	
P. L. Jarrett	Environment and Climate Change Canada, Toronto, Ontario, Canada <i>Category: General Interest</i>	
M. A. Kadam	Toronto Hydro, Ontario, Canada	<i>Non-voting</i>
C. Kafel	Alectra Utilities Corporation, Mississauga, Ontario, Canada <i>Category: Electricity Distribution Interest</i>	
Z. J. Kieloch	Manitoba Hydro, Winnipeg, Manitoba, Canada	
B. Lacoursiere	Skipper Limited, Calgary, Alberta, Canada <i>Category: General Interest</i>	
D. Lamont	CIMA Canada Inc, St John's, Newfoundland and Labrador, Canada	
M. Lu	British Columbia Hydro, Burnaby, British Columbia, Canada	<i>Non-voting</i>

R. MacKenzie	NB Power, Rothesay, New Brunswick, Canada	<i>Non-voting</i>
I. Mathurin	Hydro-Québec, Distribution, Montréal, Québec, Canada <i>Category: Electricity Distribution Interest</i>	
M. B. Mehagan	Over Under Engineering Services Ltd, Guelph, Ontario, Canada	<i>Non-voting</i>
R. J. Morris	Green Quill Climate Services Inc., Aurora, Ontario, Canada	<i>Non-voting</i>
M. R. Murphy	Newfoundland Power Inc, St. John's, Newfoundland and Labrador, Canada <i>Category: Electricity Transmission Interest</i>	
M. S. Nashid	SNC Lavalin Transmission & Distribution, Toronto, Ontario, Canada	<i>Non-voting</i>
B. Nasr	Bell Canada, Scarborough, Ontario, Canada	<i>Non-voting</i>
M. O'Reilly	Hydro One, Brockville, Ontario, Canada	<i>Non-voting</i>
Y. O. Onifade	BC Hydro, Burnaby, British Columbia, Canada <i>Category: Electricity Transmission Interest</i>	
C. I. Orde	Utilitech Consulting Inc., Nanton, Alberta, Canada	<i>Non-voting</i>
D. S. Parikh	Hydro One Networks Inc., Toronto, Ontario, Canada	<i>Non-voting</i>
M. Peckover	Manitoba Hydro, Brandon, Manitoba, Canada <i>Category: Electricity Distribution Interest</i>	
C. Piller	Sasktel, Regina, Saskatchewan, Canada <i>Category: Carriers</i>	

R. Radons	Manitoba Hydro, Winnipeg, Manitoba, Canada <i>Category: Electricity Transmission Interest</i>	
R. Renwick	AltaLink Management Ltd., Calgary, Alberta, Canada <i>Category: Electricity Transmission Interest</i>	
J. Ribon	RR Power Consulting Inc., Ontario, Canada	<i>Non-voting</i>
P. J. Rioux	Hydro-Québec, Montréal, Québec, Canada <i>Category: Electricity Transmission Interest</i>	
N. Sharma	Hydro Ottawa, Ottawa, Ontario, Canada	<i>Non-voting</i>
T. Shmyr	EPCOR Distribution and Transmission, Edmonton, Alberta, Canada <i>Category: Electricity Distribution Interest</i>	
H. Taki	Toronto Hydro, Toronto, Ontario, Canada	<i>Non-voting</i>
J. Toth	Enginomix Consulting Inc., Vancouver, British Columbia, Canada	<i>Non-voting</i>
S. M. Turcot	Bell Canada, Montréal, Québec, Canada <i>Category: Carriers</i>	
T. Turk	Toronto Hydro-Electric System Ltd., Toronto, Ontario, Canada <i>Category: Electricity Distribution Interest</i>	
K. van Popta	FortisAlberta Inc, Sherwood Park, Alberta, Canada	<i>Non-voting</i>
T. Walker	TELUS, Calgary, Alberta, Canada <i>Category: Carriers</i>	
C. Wensley	SaskPower, Saskatchewan, Canada	<i>Non-voting</i>

M. White	Cogeco Connexion, Niagara Falls, Ontario, Canada <i>Category: Carriers</i>	
E. H. Wiebe	Innovative Solutions Engineering Inc., Winnipeg, Manitoba, Canada <i>Category: General Interest</i>	
M. Wyndham	Hydro Ottawa Limited, Ottawa, Ontario, Canada	<i>Non-voting</i>
R. Yee	Canadian Electricity Association, Ottawa, Ontario, Canada	
S. Attarde	CSA Group, Toronto, Ontario, Canada	<i>Project Manager</i>

Technical Committee on Overhead Systems

J. A. McFadgen	Nova Scotia Power Inc., Halifax, Nova Scotia, Canada <i>Category: Electricity Distribution Interest</i>	<i>Chair</i>
S. Cumming	Sonideft Inc., Middle Sackville, Nova Scotia, Canada <i>Category: Carriers</i>	<i>Vice-Chair</i>
A. Afshar	Hydro One Networks Inc., Toronto, Ontario, Canada	<i>Non-voting</i>
I. Albanese	TELUS, Burnaby, British Columbia, Canada	<i>Non-voting</i>
A. Balasoiu	Hydro-Québec, Distribution, Montréal, Quebec, Canada <i>Category: Electricity Distribution Interest</i>	
M. D. Bell	Hydro One Networks Inc, Toronto, Ontario, Canada <i>Category: Electricity Distribution Interest</i>	
E. Chan	Ontario Ministry of Labour, Training and Skills Development, Toronto, Ontario, Canada	<i>Non-voting</i>
F. Dennert	British Columbia Hydro, Burnaby, British Columbia, Canada <i>Category: Electricity Distribution Interest</i>	
M. Dziurda	Synergy North, Thunder Bay, Ontario, Canada	<i>Non-voting</i>
F. Fahmy	Railway Association of Canada, Ottawa, Ontario, Canada	<i>Non-voting</i>
K. Fournier	Canadian Electricity Association , Ottawa, Ontario	<i>Non-voting</i>
L. Gallagher	Utilities Standards Forum, Guelph, Ontario, Canada	<i>Non-voting</i>

T. Gardiner	Newfoundland and Labrador Hydro, St. John's, Newfoundland and Labrador, Canada	<i>Non-voting</i>
E. Ghannoum	Montréal, Quebec, Canada <i>Category: General Interest</i>	
E. Halilovic	Toronto Hydro-Electric System LTD, Toronto, Ontario, Canada	<i>Non-voting</i>
I. Hathout	Hathout PGS. Inc., Mississauga, Ontario, Canada <i>Category: General Interest</i>	
J. Hrycshyn	Electrical Safety Authority, Mississauga, Ontario, Canada <i>Category: General Interest</i>	
M. F. Ishac	ISHAC Engineering, Toronto, Ontario, Canada <i>Category: General Interest</i>	
P. L. Jarrett	Environment and Climate Change Canada, Toronto, Ontario, Canada <i>Category: General Interest</i>	
M. A. Kadam	Toronto Hydro, Toronto, Ontario, Canada	<i>Non-voting</i>
C. Kafel	Alectra Utilities Corporation, Mississauga, Ontario, Canada <i>Category: Electricity Distribution Interest</i>	
Z. J. Kieloch	Manitoba Hydro, Winnipeg, Manitoba, Canada	<i>Non-voting</i>
B. Lacoursiere	TAPP, Inc., Calgary, Alberta, Canada <i>Category: General Interest</i>	
M. Lu	British Columbia Hydro, Burnaby, British Columbia, Canada	<i>Non-voting</i>
R. MacKenzie	NB Power, Rothesay, New Brunswick, Canada	<i>Non-voting</i>

I. Mathurin	Hydro-Québec, Distribution, Montréal, Quebec, Canada	<i>Non-voting</i>
M. B. Mehagan	Over Under Engineering Services Ltd., Guelph, Ontario, Canada	<i>Non-voting</i>
R. J. Morris	Green Quill Climate Services Inc, Aurora, Ontario, Canada	<i>Non-voting</i>
M. R. Murphy	Newfoundland Power Inc., St. John's, Newfoundland and Labrador, Canada <i>Category: Electricity Transmission Interest</i>	
B. Nasr	Bell Canada, Scarborough, Ontario, Canada	<i>Non-voting</i>
M. O'Reilly	Hydro One, Brockville, Ontario, Canada	<i>Non-voting</i>
Y. O. Onifade	BC Hydro, Burnaby, British Columbia, Canada <i>Category: Electricity Transmission Interest</i>	
C. I. Orde	Utilitech Consulting Inc., Nanton, Alberta, Canada	<i>Non-voting</i>
D. S. Parikh	Hydro One Networks Inc., Toronto, Ontario, Canada	<i>Non-voting</i>
M. Peckover	Manitoba Hydro, Brandon, Manitoba, Canada <i>Category: Electricity Distribution Interest</i>	
C. Piller	Sasktel, Regina, Saskatchewan, Canada <i>Category: Carriers</i>	
R. Radons	Manitoba Hydro, Winnipeg, Manitoba, Canada <i>Category: Electricity Transmission Interest</i>	
R. Renwick	AltaLink Management Ltd., Calgary, Alberta, Canada <i>Category: Electricity Transmission Interest</i>	

J. Ribon	Stantec Consulting Ltd., Waterloo, Ontario, Canada	<i>Non-voting</i>
P. J. Rioux	Hydro-Quebec, Montréal, Québec, Canada <i>Category: Electricity Transmission Interest</i>	
N. Sharma	Hydro Ottawa, Ottawa, Ontario, Canada	<i>Non-voting</i>
T. Shmyr	EPCOR Distribution and Transmission, Edmonton, Alberta, Canada <i>Category: Electricity Distribution Interest</i>	
H. Taki	Toronto Hydro, Toronto, Ontario, Canada	<i>Non-voting</i>
J. Toth	Enginomix Consulting Inc., Vancouver, British Columbia, Canada	<i>Non-voting</i>
S. M. Turcot	Bell Canada, Montréal, Québec, Canada <i>Category: Carriers</i>	
T. Turk	Toronto Hydro-Electric System LTD, Toronto, Ontario, Canada <i>Category: Electricity Distribution Interest</i>	
K. van Popta	FortisAlberta Inc., Sherwood Park, Alberta, Canada	<i>Non-voting</i>
T. Walker	TELUS, Calgary, Alberta, Canada <i>Category: Carriers</i>	
M. White	Cogeco Connexion, Niagara Falls, Ontario, Canada <i>Category: Carriers</i>	
E. H. Wiebe	Innovative Solutions Engineering Inc., Winnipeg, Manitoba, Canada <i>Category: General Interest</i>	

M. WyndhamHydro Ottawa Limited,
Ottawa, Ontario, Canada*Non-voting***S. Attarde**CSA Group,
Toronto, Ontario, Canada*Project Manager*

① Preface

This is the eleventh edition of CSA C22.3 No. 1, *Overhead systems*, one of a series of Standards issued under the *Canadian Electrical Code, Part III*. It supersedes the previous editions, published in 2015, 2010, 2006, 2001, 1987, 1985, 1979, 1976, and 1970, and the original edition, which was published as a series of five Standards in 1959, 1953, 1947, and 1940.

Major changes to this edition include the following:

- a revised scope of the Standard extends to the inside of buildings or sections of buildings that are employed by a utility;
- new and revised definitions with an updated use of terminology:
 - the following new definitions: “buckling”, “covered conductor bundled system”, “geometric non-linearity”, “minor waterways”, “stability”, and “wireless communication antenna”; and
 - the following revised definitions: “linear analysis”, “non-linear analysis”, and “service conductor”;
- revision to Clause [4.1.3](#) on accessibility;
- revision to Clause [4.2.7.2](#) on the use of guy insulators;
- new clauses added to address
 - wireless communication antenna; and
 - natural gas and propane equipment clearances and separations;
- revision to Clauses [5.2.5](#) and [5.2.6](#) on conductor temperature for thermal loading conditions;
- revision to weather loading methods in Clause [7.2.3](#) to include historical weather loads;
- climate change adaptation requirements to neutral supported secondary service wires;
- the requirements on structural analysis (geometric non-linear design);
- conductor tension considerations under structure deflection to improve clarity;
- effective grounding requirements of non-current-carrying items under Clauses [9.1.8](#) and [9.2.7](#);
- minimum vertical design clearances and separations above ground or rails in Tables [2](#) and [4](#) and Figure [A.14](#);
- Table [9](#) for minimum clearances to above-ground pipelines;
- Table [10](#) for minimum design clearances to bridges;
- minimum design vertical clearances between wires crossing each other and supported by different supporting structures: Table [13](#) to expand on the clearances between ac (upper level) and dc (lower level)
- Table [35](#) for flashover distance for ac conductors and Table [36](#) for dc conductors;
- Annex [A](#):
 - guidance on the use of prior versions of this Standard;
 - guidance on the point of attachment for supply conductors to buildings; and
 - guidance on information criteria to replace or reinforce wood pole structures;
- Annex [D](#): Table [D.2](#), mean annual maximum snow depth for selected Canadian locations; and
- Annex [E](#) for guidance on the covered conductor bundled systems;

Update 1 include the following changes:

- The following additions to address climate change adaptation:
 - climatic data for selected locations;
 - flooding and flood hazard zones;
 - weather loadings;
 - vegetation management;
 - discontinuous permafrost; and
 - ice removal management system;
- Clauses related to aviation requirements;