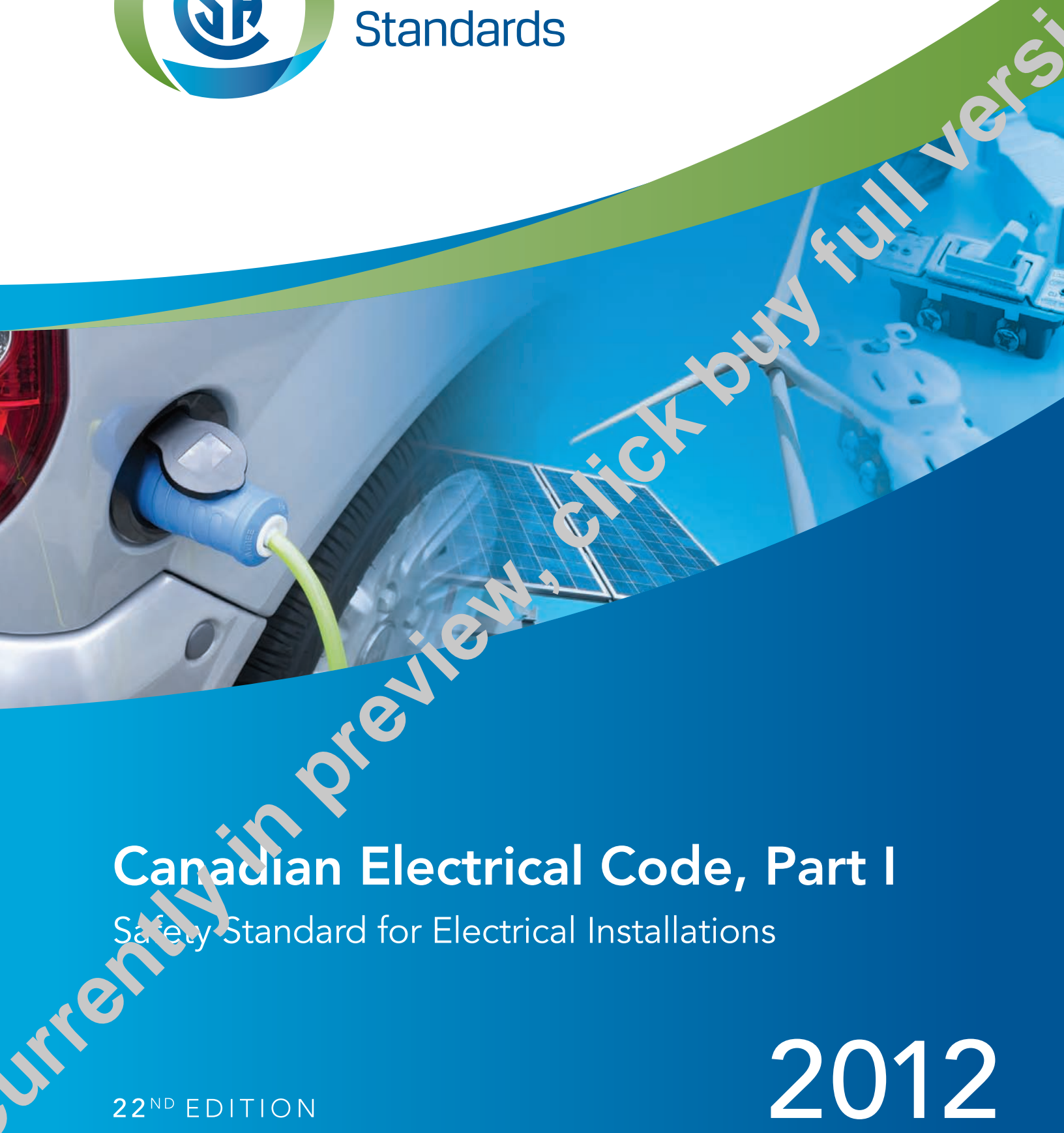




CSA
Standards

C22.1-12



Canadian Electrical Code, Part I

Safety Standard for Electrical Installations

22ND EDITION

2012

Legal Notice for Standards

Canadian Standards Association (CSA) standards are developed 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 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 does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA makes no representations or warranties regarding this document's compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA, 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 HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA 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 accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA is a private not-for-profit company that publishes voluntary standards and related documents. CSA 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 and the users of this document (whether it be in printed or electronic form), CSA 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's and/or others' intellectual property and may give rise to a right in CSA and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by licence or by law, CSA 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 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 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 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; 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.





CE CODE AND RELATED PRODUCTS

2012 CE CODE HANDBOOK (HARDCOPY)

Companion to the 2012 Code; provides clarity in understanding the rationale behind key Code changes and safety requirements.

AVAILABLE MARCH 2012

2012 CE CODE HARDCOPY & HANDBOOK PACKAGE

SAVE \$10 when you purchase the CE Code and Handbook together.
(NOTE: HANDBOOK WILL SHIP MARCH 15TH, 2012)

NEW 2012 CE CODE CALCULATORS

Interactive tool helps with most common electrical calculations; enter the particulars of your situation to come up with the appropriate result.

UPDATED Z462 – WORKPLACE ELECTRICAL SAFETY

Extensively revised, and aligned to the 2012 CE Code; best safety practices for work on and around electrical equipment, guidance on due diligence in prevention of electrical injuries, and more.

UPDATED 2012 CE CODE SMART STANDARD (PDF)

Access CE Code information on your personal computer; includes complete text, tables, figures and diagrams from both the Code and Handbook.

AVAILABLE MARCH 2012

NEW CE CODE ELECTRICIAN'S QUICK REFERENCE GUIDE

Quick reference for construction electricians on commonly used terms, rules and calculations found in the CE Code.

AVAILABLE JULY 2012

In addition to the Canadian Electrical Code, CSA Standards offers a variety of CEC-related publications and resources, including new calculation tools and updated smart standards.

For more information or to purchase CE Code products, call (773) 362-7037 or visit www.knowthecode2012.com





TRAINING RESOURCES AND TOOLS

NEW 2012 CEC UPDATE TRAINING

Extensive review of 2012 CE Code changes/revisions helps you understand how they apply to your business/workplace. Choose workshop or online delivery.

NEW ELECTRICAL SAFETY AWARENESS FOR NON-ELECTRICAL WORKERS

Introduces and teaches the basics of Electrical Code and other safety-related issues and standards.

NEW MASTER ELECTRICIAN TRAINING

Designed to expand the knowledge and skills of electricians and others who are qualified to be licensed (P.Eng, CET, C-Tech), in preparation for the Master Electrician Examination.

UPDATED ELECTRICAL EQUIPMENT IN HAZARDOUS LOCATIONS

Guide to understanding the principles for designing and installing electrical equipment for use in hazardous locations.

AVAILABLE FEBRUARY 2012

NEW 2012 CANADIAN ELECTRICIAN STUDY GUIDE (HARD COPY)

Based on the Electrician Occupational Analysis, helps apprentices prepare for the Red Seal Certification of Qualification (C of Q) Exam.

AVAILABLE JULY 2012

NEW CANADIAN ELECTRICIAN EXAM PREP TOOLS (ONLINE)

Nearly 2000 sample questions covering each block, task and sub task in the Red Seal's Occupational Analysis for Construction Electricians. Watch for our mobile app coming Summer 2012.

AVAILABLE JULY 2012

Additional courses are planned for release throughout the 2012 Code cycle, covering topics including photovoltaic systems, renewable energy systems, equipment in hazardous locations, and more.

Visit shop.csa.ca for the most up-to-date offering of electrical training courses.

From tools and study guides for apprentices, to overview & update training for licensed professionals, to specialized training, CSA Standards offers a comprehensive suite of training solutions based on the 2012 Canadian Electrical Code and other related standards. Visit our web site for the latest information on courses and availability.

For course schedules and information or to register, call (877) 362-7037 or visit www.knowthecode2012.com



CSA Standards Update Service

C22.1-12

January 2012

Title: *Canadian Electrical Code, Part I*

Pagination: **678 pages** (xxxv preliminary and 643 text)

Automatic notifications about any updates to this publication are available online.

To register for e-mail notifications, and/or to download any existing updates in PDF, enter the Online Store at **www.Shop.CSA.ca** and click on **My Account** on the navigation bar. Then, click on **E-mail Services** and click on **CSA Standards Update Service**.

The **List ID** for this document is **2421308**. Please enter this **List ID** in the appropriate field to sign up for updates to this publication.

Currently in preview, click buy full version

CSA Standard

C22.1-12
**Canadian Electrical Code,
Part I**

Safety Standard for Electrical Installations

(Twenty-second edition)



™ Trade mark of Canadian Standards Association

- *The Canadian Electrical Code, Part I, is a voluntary code for adoption and enforcement by regulatory authorities.*
- *The Canadian Electrical Code, Part I, meets the fundamental safety principles of International Standard IEC 60364-1, Low-voltage electrical installations.*
- *Consult with local authorities regarding regulations that adopt and/or amend this Code.*

*Published in January 2012 by Canadian Standards Association
A not-for-profit private sector organization
5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6
1-800-463-6727 • 416-747-4044*

Visit our Online Store at www.Shop.CSA.ca

Acknowledgement*

On the occasion of Annie Pereira's retirement in January 2012, CSA gratefully acknowledges her outstanding contribution to the development and publication of the *Canadian Electrical Code, Part I*. In her 37 years with CSA, Annie has worked on eight editions of the *Code*. Her organizational expertise, attention to detail, and infinite patience have been key elements in their success.

ISBN 978-1-55491-666-5

Technical Editor: Tim Pope

© Canadian Standards Association — 2012

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

Contents

Committee on <i>Canadian Electrical Code, Part I</i>	x
Regulatory Authority Committee	xii
Executive Committee	xiii
<i>National Building Code/Canadian Electrical Code Liaison Committee</i>	xiii
Section Subcommittees	xiii
Preface	xxvii
The history and operation of the <i>Canadian Electrical Code, Part I</i>	xxvii
Metric units	xxix
Reference publications	xxxi
Section 0 — Object, scope, and definitions	1
Object	1
Scope	1
Definitions	1
Section 2 — General Rules	12
Administrative	12
Technical	13
General	13
Protection of persons and property	15
Maintenance and operation	16
Enclosures	17
Section 4 — Conductors	19
Section 6 — Services and service equipment	26
Scope	26
General	26
Control and protective equipment	27
Wiring methods	29
Metering equipment	30
Section 8 — Circuit loading and demand factors	32
Scope	32
General	32
Services and feeders	34
Branch circuits	36
Automobile heater receptacle	37
Section 10 — Grounding and bonding	38
Scope and object	38
System and circuit grounding	38
Grounding connections for systems and circuits	39
Conductor enclosure bonding	40
Equipment bonding	41
Methods of grounding	43
Bonding methods	43
Grounding electrodes	46
Grounding and bonding conductors	47
Grounding and bonding conductor connections	49
Lightning arresters	50
Installation of neutral grounding devices	50
Section 12 — Wiring methods	52
Scope	52
General requirements	52
Conductors	53
General	53

Open wiring	56
Exposed wiring on exteriors of buildings and between buildings on the same premises	57
Bare busbars and risers	58
Non-metallic-sheathed cable	59
Armoured cable	60
Mineral-insulated cable, aluminum-sheathed cable, and copper-sheathed cable	62
Flat conductor cable Type FCC	63
Raceways	64
General	64
Rigid and flexible metal conduit	67
Rigid PVC conduit	68
Rigid Types EB1 and DB2/ES2 PVC conduit	69
Rigid RTRC conduit	70
Liquid-tight flexible conduit	71
Electrical metallic tubing	71
Electrical non-metallic tubing	72
Surface raceways	72
Underfloor raceways	73
Cellular floors	74
Auxiliary gutters	75
Busways and splitters	75
Wireways	77
Cable trays	78
Cablebus	79
Manufactured wiring systems	81
Installations of boxes, cabinets, outlets, and terminal fittings	81
Section 14 — Protection and control	86
Scope	86
General requirements	86
Protective devices	87
General	87
Fuses	89
Circuit breakers	90
Control devices	90
General	90
Switches	91
Protection and control of miscellaneous apparatus	93
Solid-state devices	93
Section 16 — Class 1 and Class 2 circuits	95
General	95
Class 1 circuits	95
Class 2 circuits	96
Section 18 — Hazardous locations	100
Scope and introduction	100
General	101
Class I locations	105
Installations in Class I, Zone 0 locations	105
Installations in Class I, Zone 1 locations	105
Installations in Class I, Zone 2 locations	108
Class II locations	110
Installations in Class II, Division 1 locations	110
Installations in Class II, Division 2 locations	112
Class III locations	115
Installations in Class III, Division 1 locations	115
Installations in Class III, Division 2 locations	117

Section 20 — Flammable liquid and gas dispensing and service stations, garages, bulk storage plants, finishing processes, and aircraft hangars 119

- Gasoline dispensing and service stations 119
- Propane dispensing, container filling, and storage 120
- Compressed natural gas refuelling stations, compressors, and storage facilities 121
- Commercial garages — Repairs and storage 122
- Residential storage garages 123
- Bulk storage plants 123
- Finishing processes 125
- Aircraft hangars 128

Section 22 — Locations in which corrosive liquids, vapours, or excessive moisture are likely to be present 130

- General 130
- Equipment 130
- Wiring 131
- Drainage, sealing, and exclusion of moisture and corrosive vapour 132
- Circuit control 132
- Materials 132
- Bonding 132
- Sewage lift and treatment plants 133

Section 24 — Patient care areas 135

- Patient care areas 136
- Isolated systems 138
- Essential electrical systems 139

Section 26 — Installation of electrical equipment 141

- General 141
- Isolating switches 142
- Circuit breakers 142
- Fuses and fusible equipment 142
- Capacitors 142
- Transformers 144
- Fences 148
- Electrical equipment vaults 149
- Cellulose nitrate film storage 149
- Panelboards 150
- Lightning arresters 150
- Low-voltage surge protective devices 151
- Storage batteries 151
- Arc lamps 152
- Resistance devices 152
- Receptacles 153
- Receptacles for residential occupancies 154
- Branch circuits for residential occupancies 156
- Electric heating and cooking appliances 157
- Bare element water heaters 158
- Heating equipment 159
- Pipe organs 159
- Submersible pumps 159
- Data processing 160

Section 28 — Motors and generators 161

- Scope 161
- General 161
- Wiring methods and conductors 162
- Overcurrent protection 163

Overload and overheating protection 165

Undervoltage protection 166

Control 166

Disconnecting means 167

Hermetic refrigerant motor-compressors 169

Multi-winding and part-winding-start motors 170

Protection and control of generators 171

Section 30 — Installation of lighting equipment 172

General 172

Location of lighting equipment 173

Installation of lighting equipment 173

Wiring of lighting equipment 175

Luminaires in buildings of residential occupancy 176

Lampholders 177

Electric-discharge lighting systems operating at 1000 V or less 177

Electric-discharge lighting systems operating at more than 1000 V 178

 Recessed luminaires 179

 Permanent outdoor floodlighting installations 180

 Exposed wiring for permanent outdoor lighting 183

Extra-low-voltage lighting systems 184

Section 32 — Fire alarm systems, fire pumps, and carbon monoxide alarms 185

Fire alarm systems 185

Fire pumps 186

Section 34 — Signs and outline lighting 188

General requirements 188

Enclosures 189

Neon supplies 189

Wiring methods 190

Section 36 — High-voltage installations 192

General 192

Wiring methods 193

Control and protective equipment 195

Grounding and bonding 196

Section 38 — Elevators, dumbwaiters, material lifts, escalators, moving walks, lifts for persons with physical disabilities, and similar equipment 200

Elevators 201

Escalators 203

Lifts for persons with physical disabilities 203

Section 40 — Electric cranes and hoists 208

Section 42 — Electric welders 210

General 210

Transformer arc welders 210

Motor-generator arc welders 211

Resistance welders 211

Section 44 — Theatre installations 213

Scope 213

General 213

Fixed stage switchboards 213

Portable switchboards on stage 214

Fixed stage equipment 214

Portable stage equipment 216

Section 46 — Emergency power supply, unit equipment, exit signs, and life safety systems	217
General	217
Emergency power supply	218
Unit equipment	219
Exit signs	219
Section 48	<i>Deleted</i>
Section 50 — Solar photovoltaic systems	220
Section 52 — Diagnostic imaging installations	223
Section 54 — Community antenna distribution and radio and television installations	225
Community antenna distribution	225
Protection	226
Grounding	227
Conductors within buildings	227
Equipment	228
Conductors outside of buildings	228
Underground circuits	229
Receiving equipment and amateur transmitting equipment	230
Grounding for receiving equipment and amateur transmitting equipment	230
Transmitting stations	231
Section 56 — Optical fiber cables	232
Scope	232
General	232
Installation methods	232
Section 58 — Passenger ropeways and similar equipment	234
Scope	234
General	234
General requirements	234
Conductors	235
Wiring methods	235
Protection and control	236
Branch circuits	237
Regenerative power	237
Section 60 — Electrical communication systems	238
Scope	238
General	238
Protection	238
Inside conductors	239
Equipment	241
Outside conductors	241
Underground circuits	243
Grounding	243
Section 62 — Fixed electric space and surface heating systems	245
Scope	245
General	245
Electric space-heating systems	249
Electric surface heating systems	251
Other heating systems	253
Section 64 — Renewable energy systems	254
General	256
Inverters	259
Stationary fuel cell systems	261
Small wind systems	262

Large wind systems 264
Micro-hydropower systems 265
Hydrokinetic power systems 266
Storage batteries 267

Section 66 — Amusement parks, midways, carnivals, film and TV sets, TV remote broadcasting locations, and travelling shows 269

Scope and application 269
General 269
Grounding 269
Services and distribution 270
Wiring methods and equipment 270
Single-conductor cables 270
Motors 271

Section 68 — Pools, tubs, and spas 272

Scope 272
General 272
Permanently installed swimming pools 275
Storable swimming pools 276
Hydromassage bathtubs 276
Spas and hot tubs 276

Section 70 — Electrical requirements for factory-built relocatable structures and non-relocatable structures 278

Scope 278
Relocatable structures 278
Non-relocatable structures (factory-built) 282

Section 72 — Mobile home and recreational vehicle parks 283

Scope and application 283
General 283

Section 74 — Airport installations 285

Section 76 — Temporary wiring 287

Section 78 — Marinas, yacht clubs, marine wharves, structures, and fishing harbours 289

Marinas and yacht clubs 289
Marine wharves, structures, and fishing harbours 290

Section 80 — Cathodic protection 292

Section 82 — Closed-loop and pre-closed-loop power distribution 294

Section 84 — Interconnection of electric power production sources 296

Section 86 — Electric vehicle charging systems 298

Scope 298
General 298
Equipment 298
Control and protection 298
Electric vehicle charging equipment locations 299

Tables 300

Diagrams 367

Appendix A — Safety standards for electrical equipment, *Canadian Electrical Code, Part II* 376

Appendix B — Notes on Rules 391

Appendix C — The Technical Committee on the *Canadian Electrical Code, Part I* — Organization and rules of procedure 494

Appendix D — Tabulated general information 512

Appendix E — Dust-free rooms 555

- Appendix F** — Recommended installation practice for intrinsically safe and non-incendive electrical equipment and wiring 558
- Appendix G** — Electrical installations of fire protection systems 566
- Appendix H** — Combustible gas detection instruments for use in Class I hazardous locations 570
- Appendix I** — Interpretations 573
- Appendix J** — Rules and Notes to Rules for installations using the Division system of classification for Class I locations 574
- Appendix K** — Extract from IEC 60364-1 615
- Index** 621

Committee on *Canadian Electrical Code, Part I*

(Membership list as of June 2011)

A.Z. Tsisserev (<i>Chair</i>)	Stantec Consulting Ltd., Vancouver, British Columbia
S.W. Douglas (<i>Vice-Chair</i>)	International Association of Electrical Inspectors, Toronto, Ontario
T. Pope (<i>Project Manager</i>)	Canadian Standards Association, Mississauga, Ontario

Representing Provincial and Territorial Electrical Inspection Authorities

M.S. Anderson	SaskPower, Regina, Saskatchewan
D. Badry	Government of Yukon, Whitehorse, Yukon
L. Ferchoff	Manitoba Hydro, Winnipeg, Manitoba
S. Hinde	British Columbia Safety Authority (BCSA), Nanaimo, British Columbia
R.J. Kelly	Government of Nunavut Community & Government Services, Iqaluit, Nunavut
T. Kitson	Department of Environment, Energy and Forestry, Charlottetown, Prince Edward Island
J. LeBlanc	Department of Public Safety, Moncton, New Brunswick
D.R.A. MacLeod	Department of Labour and Advanced Education, Halifax, Nova Scotia
R. Marion	Government of the Northwest Territories, Yellowknife, Northwest Territories
P. McDonald	Department of Municipal Affairs, Edmonton, Alberta
G. Montminy	Régie du bâtiment du Québec, Québec, Québec
M. Mosher	Government of Newfoundland and Labrador, St. John's, Newfoundland and Labrador
T. Olechna	Electrical Safety Authority, Mississauga, Ontario

Representing Municipal Electrical Inspection Authorities

D. Hallock	City of Winnipeg, Manitoba
D. Holmes	City of Calgary, Alberta
M.K. Shea	City of Victoria, British Columbia

Representing Accredited Certification Organizations

R. Berman (<i>Associate</i>)	Underwriters Laboratories Inc., Northbrook, Illinois, USA
J.H. Morrison (<i>Associate</i>)	QPS Evaluation Services Inc., Toronto, Ontario
G. Paintal (<i>Associate</i>)	Underwriters Laboratories of Canada, Scarborough, Ontario
S. Paulsen (<i>Associate</i>)	CSA International, Toronto, Ontario

Representing Bahamas

C. Bartlett (<i>Associate</i>)	The Grand Bahama Development Company Ltd., Grand Bahama Island, Bahamas
D.B. King (<i>Associate</i>)	Ministry of Works and Transport, Nassau, Bahamas

Representing Canada West Ski Areas Association

W. Sparks	Doppelmayr CTEC Ltd., Kelowna, British Columbia
-----------	---

Representing Canadian Association of Petroleum Producers

V.G. Rowe	Marex Canada Limited, Nanaimo, British Columbia
-----------	---

Representing Canadian Electrical Contractors Association

E.M. Roberts (<i>Associate</i>)	Canadian Electrical Contractors Association, Toronto, Ontario
J.B. Salmon	A.R. Milne Industrial Electric Ltd., Waterloo, Ontario

Representing Canadian Electricity Association

J. Côté Hydro-Québec, Montréal, Québec
 F.L. Kaempffer BC Hydro, Burnaby, British Columbia

Representing Canadian Home Builders Association

D. Johnston (*Associate*) Canadian Home Builders Association, Ottawa, Ontario

Representing Committee on Use of Electricity in Mines

G. Lobay CANMET, Natural Resources Canada, Kars, Ontario

Representing Committee on Workplace Electrical Safety

D.T. Roberts (*Associate*) Schneider Electric Canada, Inc., Mississauga, Ontario

Representing Committees on The Canadian Electrical Code, Part II, Application of Electricity in Healthcare, and Emergency Electrical Power Supply for Buildings

A.Z. Tsisserev Stantec Consulting Ltd., Vancouver, British Columbia

Representing Communication Industry

E.S. Alfonso TELUS, Burnaby, British Columbia
 S. Turcot (*Associate*) Bell Canada, Montréal, Québec

Representing Division of Building Research NRC

P. Rizcallah National Research Council Canada, Canadian Codes Centre, Ottawa, Ontario

Representing Education

K. Harrison Northern Alberta Institute of Technology, Edmonton, Alberta
 T. Simmons British Columbia Institute of Technology, Burnaby, British Columbia

Representing Electro-Federation Canada

W.J. Bryans (*Associate*) Electro-Federation Canada, Toronto, Ontario
 R.P. de Lhorbe Schneider Electric Canada, Inc., Richmond, British Columbia
 P. Desilets Leviton Manufacturing of Canada Limited, Pointe-Claire, Québec
 V.V. Gagachev (*Associate*) Eaton, Burlington, Ontario
 B.F. O'Connell Tyco Thermal Controls (Canada) Ltd., Trenton, Ontario
 K.L. Rodel Hubbell Canada LP, Pickering, Ontario
 M. Smith Rockwell Automation Canada Inc. Control Systems, Cambridge, Ontario

Representing Energy Industry Electrical Engineering Associates

T.S. Driscoll (*Associate*) OBIEC Consulting Ltd., Calgary, Alberta

Representing Forest Products Association of Canada

T. Branch PDR Technologies Inc., Oakville, Ontario

Representing Institute of Electrical and Electronics Engineers (Canada)

R. Leduc Marex Canada Limited, Calgary, Alberta
 J. Turner (*Associate*) Swansea Consulting, Toronto, Ontario

Representing International Association of Electrical Inspectors

D.E. Clements (*Associate*) International Association of Electrical Inspectors, Richardson, Texas, USA
 S.W. Douglas International Association of Electrical Inspectors, Toronto, Ontario

Representing Labour

L. Cronk IBEW 1st District, Burnaby, British Columbia

Representing Mexico

M. Jimenez (*Associate*) Asociacion de Normalizacion y Certificacion AC,
 Del Gustavo A Madero, Mexico
 G. Merodio (*Associate*) Condumex, Mexico, Mexico

Representing National Defence

J. Zulak National Defence Headquarters, Ottawa, Ontario

Representing National Electrical Code Committees

M.W. Earley (*Associate*) National Fire Protection Association, Quincy, Massachusetts, USA

Representing National Electrical Manufacturers Association

J.T. Pauley (*Associate*) Schneider Electric USA, Inc., Square D, Lexington, Kentucky, USA

Representing National Elevator & Escalator Association

D. McColl Otis Canada, Inc., Mississauga, Ontario

Representing Office of the Ontario Fire Marshal

A. Kassabian (*Associate*) Ontario Ministry of Community Safety & Correctional Services,
Toronto, Ontario

Representing Railways

B.A. Biglow WINELCON, Edmonton, Alberta

Representing Standards Council of Canada

J. Martin (*Associate*) Standards Council of Canada, Ottawa, Ontario

Ex Officio Members

T.S. Driscoll OBIEC Consulting Ltd., Calgary, Alberta
T.W. Odell Toronto Hydro–Electric System Limited, Toronto, Ontario
R. Pack SaskPower, Saskatoon, Saskatchewan

Associate Members

K. McLennan Islay, Alberta
S. Misyk The Inspections Group Inc., Edmonton, Alberta
D.G. Morlidge Fluor Canada Ltd., Calgary, Alberta
A. Pottier Nova Scotia Power Inc., Halifax, Nova Scotia

Former Members

In addition to the members of the Committee, the following former members made valuable contributions to the development of this Code:

N. Breton Underwriters Laboratories of Canada, Scarborough, Ontario
W.J. Burr CSA International, Richmond, British Columbia
J. Carpenter International Association of Electrical Inspectors, Richardson, Texas, USA
D.H. Dunsire CSA Consumer Network, Winnipeg, Manitoba
J.C. Einarson Government of Yukon, Whitehorse, Yukon
P. Liberatore Corporation des maîtres électriciens du Québec, Montréal, Québec
R. Molloy Government of Newfoundland and Labrador,
St. John's, Newfoundland and Labrador
J. Neu Electro-Federation Canada, Mississauga, Ontario
J. Poulin Bell Canada, Longueuil, Québec
H. Sam Canadian Electricity Association, Ottawa, Ontario
B. Savaria Eaton Electrical Canadian Operations, Burlington, Ontario
W. Saworski SaskPower, Saskatoon, Saskatchewan
A. Sutherland Public Works and Government Services Canada, Gatineau, Québec

Regulatory Authority Committee

T. Olechna (*Chair*) Electrical Safety Authority, Mississauga, Ontario

D.R.A. MacLeod (<i>Vice-Chair</i>)	Department of Labour and Advanced Education, Halifax, Nova Scotia
M.S. Anderson	SaskPower, Regina, Saskatchewan
D. Badry	Government of Yukon, Whitehorse, Yukon
L. Ferchoff	Manitoba Hydro, Winnipeg, Manitoba
D. Hallock (<i>Associate</i>)	City of Winnipeg, Manitoba
D. Holmes (<i>Associate</i>)	City of Calgary, Alberta
R.J. Kelly	Government of Nunavut Community & Government Services, Iqaluit, Nunavut
T. Kitson	Department of Environment, Energy and Forestry, Charlottetown, Prince Edward Island
J. LeBlanc	Department of Public Safety, Moncton, New Brunswick
R. Marion	Government of the Northwest Territories, Yellowknife, Northwest Territories
P. McDonald	Department of Municipal Affairs, Edmonton, Alberta
G. Montminy	Régie du bâtiment du Québec, Québec, Québec
M. Mosher	Government of Newfoundland and Labrador, St. John's, Newfoundland and Labrador
I. Pye	British Columbia Safety Authority (BCSA), New Westminster, British Columbia
M.K. Shea (<i>Associate</i>)	City of Victoria, British Columbia
A.Z. Tsisserev (<i>Associate</i>)	Stantec Consulting Ltd., Vancouver, British Columbia
T. Pope (<i>Project Manager</i>)	Canadian Standards Association, Mississauga, Ontario

Executive Committee

A.Z. Tsisserev (<i>Chair</i>)	Stantec Consulting Ltd., Vancouver, British Columbia
S.W. Douglas (<i>Vice-Chair</i>)	International Association of Electrical Inspectors, Toronto, Ontario
P. Desilets	Leviton Manufacturing of Canada Limited, Pointe-Claire, Québec
F.L. Kaempffer	BC Hydro, Burnaby, British Columbia
G. Montminy	Régie du bâtiment du Québec, Québec, Québec
T. Simmons	British Columbia Institute of Technology, Burnaby, British Columbia
M. Smith	Rockwell Automation Canada Inc. Control Systems, Cambridge, Ontario
T. Pope (<i>Project Manager</i>)	Canadian Standards Association, Mississauga, Ontario

National Building Code/Canadian Electrical Code Liaison Committee

A.Z. Tsisserev (<i>Chair</i>)	Stantec Consulting Ltd., Vancouver, British Columbia
P. Rizcallah (<i>Vice-Chair</i>)	National Research Council Canada, Canadian Codes Centre, Ottawa, Ontario
M.S. Anderson	SaskPower, Regina, Saskatchewan
G. Dupont	Montréal, Québec
T. Fazzari	Mohawk College, Stoney Creek, Ontario
R.J. Kelly	Government of Nunavut Community & Government Services, Iqaluit, Nunavut
R.A. Nelson	Canadian Standards Association, Mississauga, Ontario
S. Paulsen	CSA International, Toronto, Ontario
T. Pope (<i>Project Manager</i>)	Canadian Standards Association, Mississauga, Ontario

Section Subcommittees

Section 0 — Object, scope, and definitions

G. Lobay (<i>Chair</i>)	CANMET, Natural Resources Canada, Kars, Ontario
---------------------------	---

J. Côté	Hydro-Québec, Montréal, Québec
R.C. Gilmour	Ancaster, Ontario
D.J. Heron	Electrical Safety Authority, Sudbury, Ontario
G. Montminy	Régie du bâtiment du Québec, Québec, Québec
S. Paulsen	CSA International, Toronto, Ontario
M.K. Shea	City of Victoria, British Columbia (Representing International Association of Electrical Inspectors)
A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia

Section 2 — General Rules

S.W. Douglas (<i>Chair</i>)	International Association of Electrical Inspectors, Toronto, Ontario
M. Smith (<i>Vice-Chair</i>)	Rockwell Automation Canada Inc. Control Systems, Cambridge, Ontario
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
G. Jones	Assiniboine Community College, Brandon, Manitoba
R.J. Kelly	Government of Nunavut Community & Government Services, Iqaluit, Nunavut
D.G. Morlidge	Fluor Canada Ltd., Calgary, Alberta
S. Paulsen	CSA International, Toronto, Ontario
D.T. Roberts	Schneider Electric Canada, Inc., Mississauga, Ontario
R. Tuttle	City of Vancouver, British Columbia (Representing International Association of Electrical Inspectors)

Section 4 — Conductors

B.F. O'Connell (<i>Chair</i>)	Tyco Thermal Controls (Canada) Ltd., Trenton, Ontario
L. Asselin	Laval, Québec (Representing International Association of Electrical Inspectors)
G.R. Beer	Jay Electric & Enerscan Controls, Brampton, Ontario
G.H. Brunt	F.C. O'Neill Scriven & Associates, Halifax, Nova Scotia
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
C. Hunter	Alcan Cable, Las Vegas, Nevada, USA
R. Kummer	Southwire Company, Carrollton, Georgia, USA
I. Muller	Nexans Canada Inc., Markham, Ontario
R.A. Nelson	Canadian Standards Association, Mississauga, Ontario
S. Paulsen	CSA International, Toronto, Ontario
A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia

Section 6 — Services and service equipment

R.J. Kelly (<i>Chair</i>)	Government of Nunavut Community & Government Services, Iqaluit, Nunavut
P. Liberatore (<i>Vice-Chair</i>)	Corporation des maîtres électriciens du Québec, Montréal, Québec
W.J. Burr	Burr and Associates, Campbell River, British Columbia
J. Côté	Hydro-Québec, Montréal, Québec
J.G. Gamble	C. Gamble Electric (1982) Ltd., Winnipeg, Manitoba
D. Letcher	Don Letcher (E.S.C.O.) Enterprises, Sherwood Park, Alberta (Representing International Association of Electrical Inspectors)
S. Paulsen	CSA International, Toronto, Ontario
E.J. Power	Stanhope, Prince Edward Island
J. Thomson	Electrical Safety Authority, Kitchener, Ontario
A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia
V. Yu	Code Instructor Association of B.C., Burnaby, British Columbia

Section 8 — Circuit loading and demand factors

R.J. Kelly (<i>Chair</i>)	Government of Nunavut Community & Government Services, Iqaluit, Nunavut
S.W. Douglas (<i>Vice-Chair</i>)	International Association of Electrical Inspectors, Toronto, Ontario
Y. Boodram	Schneider Electric Canada, Inc., Mississauga, Ontario
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
J.W. Fotheringham	Warren, Manitoba
R.C. Gilmour	Ancaster, Ontario
K. Harrison	Northern Alberta Institute of Technology, Edmonton, Alberta
R. Moberg	DeBray Solutions, North Gower, Ontario
S. Paulsen	CSA International, Toronto, Ontario
L. Schultz	Manitoba Hydro, Radisson Training Center, Gillam, Manitoba
D. Singh	Scarborough, Ontario
J. Thomson	Electrical Safety Authority, Kitchener, Ontario
J.E. White	J.E.C. White Consulting, Burlington, Ontario
V. Yu	Code Instructor Association of B.C., Burnaby, British Columbia

Section 10 — Grounding and bonding

R. Leduc (<i>Chair</i>)	Marex Canada Limited, Calgary, Alberta
K.D. McLennan (<i>Vice-Chair</i>)	Islay, Alberta
K.B. Almon	Dartmouth, Nova Scotia
S.C. Bygrave	Michelin North America (Canada), CAO Facility, New Glasgow, Nova Scotia
T. Dinic	Electrical Safety Authority, Mississauga, Ontario
J.W. Fotheringham	Warren, Manitoba
N. LeForte	City of Surrey Planning Development Department, Surrey, British Columbia
C. LeGrandeur	ConocoPhillips Canada Ltd., Calgary, Alberta
G. Montminy	Régie du bâtiment du Québec, Québec, Québec
D.G. Morlidge	Fluor Canada Ltd., Calgary, Alberta
S. Paulsen	CSA International, Toronto, Ontario
M.K. Shea	City of Victoria, British Columbia (<i>Representing International Association of Electrical Inspectors</i>)
I.B. Simpson	Ground-it.com Consulting Ltd., North Vancouver, British Columbia

Section 12 — Wiring methods

S.W. Douglas (<i>Chair</i>)	International Association of Electrical Inspectors, Toronto, Ontario
M.S. Anderson	SaskPower, Regina, Saskatchewan
D.J. Andrews	DJA Engineering Services, Calgary, Alberta
L. Baker	Arcon Electric Ltd., London, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
J.B. Biollo	John's Enterprises Ltd., Leduc, Alberta
J. Courteau	Alcan Cable, Division of Alcan Inc., St-Laurent, Québec
J. LeBlanc	Department of Public Safety, Moncton, New Brunswick
I. Muller	Nexans Canada Inc., Markham, Ontario
S. Paulsen	CSA International, Toronto, Ontario
A. Pottier	Nova Scotia Power Inc., Halifax, Nova Scotia
P.M. Schmaltz	Electrical Contractors Association of Alberta (ECAA), Calgary, Alberta
E. Thompson	Atkore International (Allied Tube and Conduit Corporation), Harvey, Illinois, USA

Section 14 — Protection and control

R.P. de Lhorbe (<i>Chair</i>)	Schneider Electric Canada, Inc., Richmond, British Columbia
T. Branch	PDR Technologies Inc., Oakville, Ontario
S.C. Bygrave	Michelin North America (Canada), CAO Facility, New Glasgow, Nova Scotia
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
S.G. Davies	KD Projects, DeWinton, Alberta
T. Evans	CSA International, Toronto, Ontario
G.T. Gingara	Mosaic Potash Esterhazy K1 Plant, Esterhazy, Saskatchewan
D.J. Heron	Electrical Safety Authority, Sudbury, Ontario
K.E. Morris	Morris Electric Ltd., Spruce Grove, Alberta
M. Pullan	Bright Electric Limited, Jacbar Holdings Inc., Toronto, Ontario
W.C. Rossmann	Calgary, Alberta
L.G. Silecky	Mersen Canada Toronto Inc., Toronto, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
D. Singh	Scarborough, Ontario
C. Thwaites	Mersen Canada Toronto Inc., Toronto, Ontario

Section 16 — Class 1 and Class 2 circuits

T. Simmons (<i>Chair</i>)	British Columbia Institute of Technology, Burnaby, British Columbia
J.B. Biollo	John's Enterprises Ltd., Leduc, Alberta (<i>Representing International Association of Electrical Inspectors</i>)
R.J. Kelly	Government of Nunavut Community & Government Services, Iqaluit, Nunavut
D. Littlejohn	Vancouver Island University, Nanaimo, British Columbia
A. Milne	21 st Olympiad Sales, Burlington, Ontario
S. Paulsen	CSA International, Toronto, Ontario
W. Saworski	Humboldt Electric Limited, Saskatoon, Saskatchewan
A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia

Section 18 — Hazardous locations

V.G. Rowe (<i>Chair</i>)	Marex Canada Limited, Nanaimo, British Columbia
G. Lobay (<i>Vice-Chair</i>)	CANMET, Natural Resources Canada, Kars, Ontario
D.S. Adams	QPS Evaluation Services Inc., Calgary, Alberta
A. Bozek	EngWorks Inc., Calgary, Alberta
M.Y. Cole	Hubbell Canada LP, Pickering, Ontario
J.H. Dymond	Hammonds Plains, Nova Scotia
D.J. Heron	Electrical Safety Authority, Sudbury, Ontario
B. Keane	Crouse-Hinds, Division of Cooper Industries (Canada) Inc., Mississauga, Ontario
W.G. Lawrence	FM Approvals, LLC, Norwood, Massachusetts, USA
R. Leduc	Marex Canada Limited, Calgary, Alberta
G. Montminy	Régie du bâtiment du Québec, Québec, Québec
D.G. Morlidge	Fluor Canada Ltd., Calgary, Alberta
J.H. Morrison	QPS Evaluation Services Inc., Toronto, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
B. Schneider	UL International (UK) Ltd., Warrington, United Kingdom
D. Stochitoui	CSA International, Toronto, Ontario
M. Throckmorton	Shell Canada Limited, Shell Upstream Americas, Calgary, Alberta

Section 20 — Flammable liquid and gas dispensing and service stations, garages, bulk storage plants, finishing processes, and aircraft hangars

M.K. Shea (<i>Chair</i>)	City of Victoria, British Columbia
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
G.J. Drew	ConocoPhillips Canada Ltd., Calgary, Alberta
G. Lobay	CANMET, Natural Resources Canada, Kars, Ontario
A. Milivojevich	QPS Evaluation Services Inc., Toronto, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
S. Misyk	The Inspections Group Inc., Edmonton, Alberta
E.J. Power	Stanhope, Prince Edward Island
V.G. Rowe	Marex Canada Limited, Nanaimo, British Columbia
J. Thomson	Electrical Safety Authority, Kitchener, Ontario

Section 22 — Locations in which corrosive liquids, vapours, or excessive moisture are likely to be present

R.J. Kelly (<i>Chair</i>)	Government of Nunavut Community & Government Services, Iqaluit, Nunavut
L. Baker	Arcon Electrical Ltd., London, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
G.T. Gingara	Mosaic Potash Esterhazy K1 Plant, Esterhazy, Saskatchewan
M. Khalid	R.V. Anderson Associates Limited, Toronto, Ontario
S. Paulsen	CSA International, Toronto, Ontario
G.T. Walker	Emery Electric, Shawnigan Lake, British Columbia
D. Wilson	Accredited Testing Services, Brandon, Manitoba

Section 24 — Patient care areas

L. Ferchoff (<i>Chair</i>)	Manitoba Hydro, Winnipeg, Manitoba
A.Z. Tsisserev (<i>Vice-Chair</i>)	Stantec Consulting Ltd., Vancouver, British Columbia
M.S. Anderson	SaskPower, Regina, Saskatchewan
M. Brossoit	CSA International, Pointe-Claire, Québec
C. Brown	SMS Engineering Ltd., Winnipeg, Manitoba
R. Dodds	Vancouver General Hospital, Vancouver, British Columbia
A.M. Dolan	University of Toronto, Toronto, Ontario
P.M. Gelinus	Hôpital du Sacré-Cœur de Montréal, Montréal, Québec
N. Hanna	Electrical Safety Authority, Mississauga, Ontario
P.E. Paasche	New Maryland, New Brunswick
D.T. Roberts	Schneider Electric Canada, Inc., Mississauga, Ontario
E. Smeltzer	Nova Scotia Power Inc., Lower Sackville, Nova Scotia (<i>Representing International Association of Electrical Inspectors</i>)

Section 26 — Installation of electrical equipment

T. Simmons (<i>Chair</i>)	British Columbia Institute of Technology, Burnaby, British Columbia
R. Leduc (<i>Vice-Chair</i>)	Marex Canada Limited, Calgary, Alberta
K. Budau	Electrical Safety Authority, Merrickville, Ontario
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
P. Desilets	Leviton Manufacturing of Canada Limited, Pointe-Claire, Québec
M.W. Earley	National Fire Protection Association, Quincy, Massachusetts, USA
V.V. Gagachev	Eaton, Burlington, Ontario
R.C. Gilmour	Ancaster, Ontario

D. Johnston	Canadian Home Builders' Association, Ottawa, Ontario
P. Liberatore	Corporation des maîtres électriciens du Québec, Montréal, Québec
R.A. Nelson	Canadian Standards Association, Mississauga, Ontario
S. Paulsen	CSA International, Toronto, Ontario
T.R. Titus	Electrical Safety Authority, New Hamburg, Ontario (Representing International Association of Electrical Inspectors)
A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia

Section 28 — Motors and generators

M. Smith (<i>Chair</i>)	Rockwell Automation Canada Inc. Control Systems, Cambridge, Ontario
M.S. Anderson	SaskPower, Regina, Saskatchewan
P. Baltazart	CIMA+, Edmonton, Alberta
J.P. Boivin	CSA International, Pointe-Claire, Québec
T. Branch	PDR Technologies, Oakville, Ontario
S.G. Davies	KD Projects, DeWinton, Alberta
S. Finnagan	Algonquin College, Ottawa, Ontario
E.J. Friesen	E.J. Friesen and Associates Incorporated, Calgary, Alberta
B.J. Mead	KeepRite Refrigeration, Division of National Refrigeration & Air Conditioning Canada Corp., Brantford, Ontario
L.G. Silecky	Mersen Canada Toronto Inc., Toronto, Ontario (Representing International Association of Electrical Inspectors)
D. Singh	Scarborough, Ontario

Section 30 — Installation of lighting equipment

P. Desilets (<i>Chair</i>)	Leviton Manufacturing of Canada Limited, Pointe-Claire, Québec
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
J.A. Davidson	Manitoba Hydro, Virden, Manitoba (Representing International Association of Electrical Inspectors)
T. Dinic	Electrical Safety Authority, Mississauga, Ontario
D. Lenasi	CSA International, Richmond, British Columbia
Q. Li	Stantec Consulting Ltd., Vancouver, British Columbia
S. Michaud	Thomas & Betts Fabrication Inc./Thomas & Betts Manufacturing Inc., Dorval, Québec
A. Milne	21 st Olympiad Sales, Burlington, Ontario
D. Rittenhouse	Maple Ridge, British Columbia

Section 32 — Fire alarm systems, fire pumps, and carbon monoxide alarms

M.S. Anderson (<i>Chair</i>)	SaskPower, Regina, Saskatchewan
S. Bent	Nova Scotia Power Inc., Kingston, Nova Scotia (Representing International Association of Electrical Inspectors)
A.N. Cavers	Underwriters Laboratories of Canada, Scarborough, Ontario
R. Dodds	Vancouver General Hospital, Vancouver, British Columbia
R. Florio	Tyco Thermal Controls — Pyrotenax, Toronto, Ontario
D. Gendebien	TornaTech Inc., St-Laurent, Québec
N. Hanna	Electrical Safety Authority, Mississauga, Ontario
R. MacKenzie	CSA International, Toronto, Ontario
P. Rizcallah	National Research Council Canada, Canadian Codes Centre, Ottawa, Ontario
V.R. Rochon	Rochon Engineering Inc., Concord, Ontario

A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia
D. Weber	Canadian Fire Alarm Association, Markham, Ontario

Section 34 — Signs and outline lighting

R. Pack (<i>Chair</i>)	SaskPower, Saskatoon, Saskatchewan
L. Catton	Acme Design Service Ltd., Tecumseh, Ontario
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
F. Dabiet	Allanson International Inc., Toronto, Ontario
J.A. Davidson	Manitoba Hydro, Virden, Manitoba (<i>Representing International Association of Electrical Inspectors</i>)
K. Devine	Electra Sign Ltd., Winnipeg, Manitoba
D. Lenasi	CSA International, Richmond, British Columbia
C. Mak	Teksign Inc., Brantford, Ontario
E.J. Power	Stanhope, Prince Edward Island
S. Scarrow	ProSign Manufacturing, Division of Pelican Signs & Decals Inc., Saskatoon, Saskatchewan

Section 36 — High-voltage installations

F.L. Kaempffer (<i>Chair</i>)	BC Hydro, Burnaby, British Columbia
R.M. Bartholomew	Electric Power Equipment Limited, Vancouver, British Columbia
J. Côté	Hydro-Québec, Montréal, Québec
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
E.P. Dick	Electric Power Diagnostics, Toronto, Ontario
T. Evans	CSA International, Toronto, Ontario
B.R. Hamilton	Bruce Hamilton Engineering Inc., Calgary, Alberta
R. Head	Electrical Safety Authority, Cambridge, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
D.J. Heron	Electrical Safety Authority, Sudbury, Ontario
A. Lawrence	Scarborough, Ontario
B. Lipson	Stantec Consulting Ltd., Vancouver, British Columbia
A.N. Sunley	Voltech Engineering Ltd., Calgary, Alberta

Section 38 — Elevators, dumbwaiters, material lifts, escalators, moving walks, lifts for persons with physical disabilities, and similar equipment

D. McColl (<i>Chair</i>)	Otis Canada Inc., Mississauga, Ontario
D.C. Balmer	Accessibility Equipment Manufacturers Association, Brampton, Ontario
B. Blackaby	OTIS, Farmington, Connecticut, USA
A.D. Byram	Department of Public Safety, Saint John, New Brunswick
K. Cheong	Applied Engineering Solutions Ltd., Vancouver, British Columbia
A. Juhasz	KONE Inc., Moline, Illinois, USA
R.M. Kennedy	Department of Labour and Advanced Education, Halifax, Nova Scotia
R. MacKenzie	CSA International, Toronto, Ontario
D. McLellan	Technical Standards & Safety Authority, Toronto, Ontario
S. Mercier	Régie du bâtiment du Québec, Montréal, Québec
M. Mihai	Technical Standards & Safety Authority, Toronto, Ontario
R. Mitchell	Electrical Safety Authority, Central Region, Meaford, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
M. Pedram	ThyssenKrupp Northern Elevator Corp., Scarborough, Ontario
I. Pye	British Columbia Safety Authority (BCSA), New Westminster, British Columbia
A. Rehman	Schindler Elevator Corporation, Morristown, New Jersey, USA

Section 40 — Electric cranes and hoists

M.S. Anderson (<i>Chair</i>)	SaskPower, Regina, Saskatchewan
B.A. Biglow	WINELCON, Edmonton, Alberta
S. Bollito	RUETGERS Canada Inc., Hamilton, Ontario
M. Chumkovski	QPS Evaluation Services Inc., Toronto, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
S.W. Douglas	International Association of Electrical Inspectors, Toronto, Ontario
R. MacKenzie	CSA International, Toronto, Ontario
L. McQuerry	Demag Cranes & Components Corp., Cleveland, Ohio, USA
J. Salisbury	ArcelorMittal Dofasco, Hamilton, Ontario
L. Uruski	Manitoba Labour, Winnipeg, Manitoba

Section 42 — Electric welders

J.B. Salmon (<i>Chair</i>)	A.R. Milne Industrial Electric Ltd., Waterloo, Ontario
P. Liberatore (<i>Vice-Chair</i>)	Corporation des maîtres électriciens du Québec, Montréal, Québec
J.P. Boivin	CSA International, Pointe-Claire, Québec
F. Hegholz	Rostec Enterprises Inc., Rosalind, Alberta
D.A. Hisey	D&R Enterprises, Fort Saskatchewan, Alberta
R. May	Richmond, British Columbia
L.G. Silecky	Mersen Canada Toronto Inc., Toronto, Ontario (<i>Representing International Association of Electrical Inspectors</i>)

Section 44 — Theatre installations

G. Montminy (<i>Chair</i>)	Régie du bâtiment du Québec, Québec, Québec
B. Bennett	Living Arts Centre, Mississauga, Ontario
D. Lenasi	CSA International, Richmond, British Columbia
T. Olechna	Electrical Safety Authority, Mississauga, Ontario
R. Ouellette	Electrical Inspector, Edmundston Region, Edmundston, New Brunswick (<i>Representing International Association of Electrical Inspectors</i>)
M. Perreault	Division immobilière de Radio-Canada, Montréal, Québec
G. Rose	Toronto, Ontario
K.E. Vannice	Leviton Manufacturing Co. Inc., Tualatin, Oregon, USA

Section 46 — Emergency power supply, unit equipment, exit signs, and life safety systems

A.Z. Tsisserev (<i>Chair</i>)	Stantec Consulting Ltd., Vancouver, British Columbia
M.S. Anderson	SaskPower, Regina, Saskatchewan
S. Aspinwall	Smith & Andersen Consulting Engineering, Toronto, Ontario
R.M. Bartholomew	Electric Power Equipment Limited, Vancouver, British Columbia
S.C. Bygrave	Michelin North America (Canada), CAO Facility, New Glasgow, Nova Scotia
P. Corby	City of Victoria, British Columbia (<i>Representing International Association of Electrical Inspectors</i>)
T. Fazzari	Mohawk College, Stoney Creek, Ontario
E. Fernando	CSA International, Toronto, Ontario
N. Hanna	Electrical Safety Authority, Mississauga, Ontario
W.L. McAllister	City of Camrose, Alberta
R.A. Nelson	Canadian Standards Association, Mississauga, Ontario
B. Parent	Cummins Est du Canada SEC, Cummins Eastern Canada LP, Candiac, Québec

M. Rendulic	Winnipeg School Division, Winnipeg, Manitoba
P. Rizcallah	National Research Council Canada, Canadian Codes Centre, Ottawa, Ontario

Section 50 — Solar photovoltaic systems

S.W. Douglas (<i>Chair</i>)	International Association of Electrical Inspectors, Toronto, Ontario
L. Cantelo	Northern Alberta Institute of Technology, Edmonton, Alberta
P.M. Cusack	S.A. Armstrong Limited, Toronto, Ontario
S. Eng	Enviro-Energy Technologies Inc., Markham, Ontario
N. Hanna	Electrical Safety Authority, Mississauga, Ontario
S. Paulsen	CSA International, Toronto, Ontario
D.B. Pollock	Electrical Safety Authority, Ilderton, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
J.B. Salmon	A.R. Milne Industrial Electric Ltd., Waterloo, Ontario
E. Smiley	PWE Consulting, Nanaimo, British Columbia

Section 52 — Diagnostic imaging installations

D.R.A. MacLeod (<i>Chair</i>)	Department of Labour and Advanced Education, Halifax, Nova Scotia
M.B. Raber (<i>Vice-Chair</i>)	Winnipeg, Manitoba
M. Brossoit	CSA International, Pointe-Claire, Québec
J.C. Einarson	Whitehorse, Yukon
W. Wetmore	QPS Evaluation Services Inc., Toronto, Ontario (<i>Representing International Association of Electrical Inspectors</i>)

Section 54 — Community antenna distribution and radio and television installations

E.S. Alfonso (<i>Chair</i>)	TELUS, Burnaby, British Columbia
E. Chantigny	General Electric Canada, Pointe-Claire, Québec
P. Olders	Terra Communications, Inc., Scarborough, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
D. Schultz	TELUS Access Technologies & Outside Plant Support, Edmonton, Alberta
S. Turcot	Bell Canada, Montréal, Québec
E. Yap	CSA International, Richmond, British Columbia

Section 56 — Optical fiber cables

E.S. Alfonso (<i>Chair</i>)	TELUS, Burnaby, British Columbia
C.B. Chan	Coquitlam, British Columbia
S. Finnagan	Algonquin College, Ottawa, Ontario
T. Hamden	CSA International, Toronto, Ontario
P. Olders	Terra Communications, Inc., Scarborough, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
V.G. Rowe	Marex Canada Limited, Nanaimo, British Columbia
A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia
S. Turcot	Bell Canada, Montréal, Québec

Section 58 — Passenger ropeways and similar equipment

W. Sparks (<i>Chair</i>)	Doppelmayr CTEC Ltd., Kelowna, British Columbia
A.N. Griffin (<i>Vice-Chair</i>)	Alberta Municipal Affairs, Edmonton, Alberta
L. Brown	Whistler & Blackcomb Mountain Resorts Limited, Whistler, British Columbia
L. Burk	Pilz Automation Safety LP, Canton, Michigan, USA

M. Chumkovski	QPS Evaluation Services Inc., Toronto, Ontario (Representing International Association of Electrical Inspectors)
P. McDermott	Technical Standards & Safety Authority, Toronto, Ontario
S. Paulsen	CSA International, Toronto, Ontario

Section 60 — Electrical communication systems

E.S. Alfonso (<i>Chair</i>)	TELUS, Burnaby, British Columbia
D.J. Andrews	DJA Engineering Services, Calgary, Alberta
S. Bent	Nova Scotia Power Inc., Kingston, Nova Scotia (Representing International Association of Electrical Inspectors)
C.B. Chan	Coquitlam, British Columbia
E. Chantigny	General Electric Canada, Pointe-Claire, Québec
P. Desilets	Leviton Manufacturing of Canada Limited, Pointe-Claire, Québec
S. Finnagan	Algonquin College, Ottawa, Ontario
E.S. Guevara	Industry Canada, Ottawa, Ontario
B. Lowe	CSA International, Richmond, British Columbia
D. Schultz	TELUS Access Technologies & Outside Plant Support, Edmonton, Alberta
R.S. Smith	Bell Aliant Cabling Solutions, Moncton, New Brunswick
A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia
S. Turcot	Bell Canada, Montréal, Québec

Section 62 — Fixed electric space and surface heating systems

T.S. Driscoll (<i>Chair</i>)	OBIEC Consulting Ltd., Calgary, Alberta
J. Turner (<i>Vice-Chair</i>)	Swansea Consulting, Toronto, Ontario
R. Barth	Thermon Manufacturing Company, San Marcos, Texas, USA
T. De Francesco	Aeromation Inc., Vancouver, British Columbia
P. den Bakker	Shell Global Solutions Canada, Calgary, Alberta
D.G. Lee	CSA International, Toronto, Ontario
R. Loiselle	Suncor Energy Inc., Calgary, Alberta
R. Pack	SaskPower, Saskatoon, Saskatchewan (Representing International Association of Electrical Inspectors)
V.G. Rowe	Marex Canada Limited, Nanaimo, British Columbia
R. Stromer	Imperial Oil Resources, Calgary, Alberta
J. Thomson	Electrical Safety Authority, Kitchener, Ontario
W.A. Williams	Tyco Thermal Controls, Menlo Park, California, USA

Section 64 — Renewable energy systems

T. Simmons (<i>Chair</i>)	British Columbia Institute of Technology, Burnaby, British Columbia
D. Vandermeer (<i>Vice-Chair</i>)	ReDriven Power Inc., Prescott, Ontario
L. Bassim	BC Hydro, Vancouver, British Columbia
G. Blagojevic	City of Vancouver National Works Yard, Vancouver, British Columbia
T. Buchal	Intertek, Cortland, New York, USA
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
T. Daye	Green Power Labs Inc., Dartmouth, Nova Scotia
S.W. Douglas	International Association of Electrical Inspectors, Toronto, Ontario
J.C. Einarson	Whitehorse, Yukon
M.S. Gardner	Alberta Municipal Affairs, Electrical Safety, Edmonton, Alberta
V. Ginter	New Energy Corp. Inc., Calgary, Alberta

N. Hanna	Electrical Safety Authority, Mississauga, Ontario
B. Knaggs	Ballard Power Systems Inc., Burnaby, British Columbia
H. Nasrat	Primax Technologies Inc., Dorval, Québec
S. Paulsen	CSA International, Toronto, Ontario
J. Pinter	BluEarth Renewables Inc., Calgary, Alberta
D.B. Pollock	Electrical Safety Authority, Ilderton, Ontario (Representing International Association of Electrical Inspectors)
A. Pottier	Nova Scotia Power Inc., Halifax, Nova Scotia
G. Ranjitkar	Natural Resources Canada, Ottawa, Ontario
J. Rostek	GE Energy, Greenville, South Carolina, USA
M. Vale	Hydrogenics Corporation, Mississauga, Ontario

Section 66 — Amusement parks, midways, carnivals, film and TV sets, TV remote broadcasting locations, and travelling shows

G. Montminy (<i>Chair</i>)	Régie du bâtiment du Québec, Québec, Québec
S. Mercier	Régie du bâtiment du Québec, Montréal, Québec
T. Olechna	Electrical Safety Authority, Mississauga, Ontario
R. Ouellette	Electrical Inspector, Edmundston Region, Edmundston, New Brunswick (Representing International Association of Electrical Inspectors)
S. Paulsen	CSA International, Toronto, Ontario
M. Perreault	Division immobilière de Radio-Canada, Montréal, Québec
A. Wanuch	Humber Centre for Trades and Technology, Toronto, Ontario
W. White	City of Vancouver Community Service Administration, Vancouver, British Columbia

Section 68 — Pools, tubs, and spas

M.S. Anderson (<i>Chair</i>)	SaskPower, Regina, Saskatchewan
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
T. Dinic	Electrical Safety Authority, Mississauga, Ontario
S.W. Douglas	International Association of Electrical Inspectors, Toronto, Ontario
R. Lachance	Hayward Pool Products Canada Inc., Oakville, Ontario
D. Lenasi	CSA International, Richmond, British Columbia
D. Letcher	Don Letcher (E.S.C.O.) Enterprises, Sherwood Park, Alberta (Representing International Association of Electrical Inspectors)
T. Minna	EPI Electrical Contractors, Brampton, Ontario
L.B. Ross	Newmarket, Ontario
D.K. Stuebing	Solon Enterprises Ltd., Peace River, Alberta
W.R. Wood	Pool & Hot Tub Council of Canada, Brampton, Ontario

Section 70 — Electrical requirements for factory-built relocatable structures and non-relocatable structures

J. LeBlanc (<i>Chair</i>)	Department of Public Safety, Moncton, New Brunswick
M.S. Anderson	SaskPower, Regina, Saskatchewan
B. Barker	Quality Auditing Institute Ltd., Coquitlam, British Columbia
J.C. Einarson	Whitehorse, Yukon
K. Maynard	Canadian Manufactured Housing Institute, Ottawa, Ontario
R.W. Morin	Grafton, Ontario (Representing International Association of Electrical Inspectors)
I. Pye	British Columbia Safety Authority (BCSA), New Westminster, British Columbia

Section 72 — Mobile home and recreational vehicle parks

D. Hallock (<i>Chair</i>)	City of Winnipeg, Manitoba
M.S. Anderson	SaskPower, Regina, Saskatchewan
J. Baker	OPCA, Embro, Ontario
B. Barker	Quality Auditing Institute Ltd., Coquitlam, British Columbia
L. Coulombe	Régie du bâtiment du Québec, Québec, Québec
J.C. Einarson	Whitehorse, Yukon
D. Letcher	Don Letcher (E.S.C.O.) Enterprises, Sherwood Park, Alberta (<i>Representing International Association of Electrical Inspectors</i>)
T. Olechna	Electrical Safety Authority, Mississauga, Ontario
I. Pye	British Columbia Safety Authority (BCSA), New Westminster, British Columbia

Section 74 — Airport installations

D. Hallock (<i>Chair</i>)	City of Winnipeg, Manitoba
E.J. Alf	Transport Canada — AARTAE, Ottawa, Ontario
G.W. Bradbury	B.T.E. Engineering Technology Services, St. Petersburg, Florida, USA (<i>Representing International Association of Electrical Inspectors</i>)
R. Chernish	National Defence, Winnipeg, Manitoba
G.T. Gingara	Mosaic Potash Esterhazy K1 Plant, Esterhazy, Saskatchewan
R. Kowalik	Alberta Transportation, Sherwood Park, Alberta
R. Larivée	Avia Rupta Solutions Inc., Boisbriand, Québec
I. Pye	British Columbia Safety Authority (BCSA), New Westminster, British Columbia

Section 76 — Temporary wiring

D.R.A. MacLeod (<i>Chair</i>)	Department of Labour and Advanced Education, Halifax, Nova Scotia
S.W. Douglas (<i>Vice-Chair</i>)	International Association of Electrical Inspectors, Toronto, Ontario
J.B. Biollo	John's Enterprises Ltd., Leduc, Alberta
J. Calabrese	Electrical Safety Authority, Scarborough, Ontario
B. Doan	Sumner Electric London Ltd., Komoka, Ontario
S. Hinde	British Columbia Safety Authority (BCSA), Nanaimo, British Columbia
T.K. Kjartanson	Manitoba Hydro, Winnipeg, Manitoba
S. Nair	WorkSafe BC, Richmond, British Columbia
B. O'Donnell	AC Powerline Construction, Pickering, Ontario
S. Paulsen	CSA International, Toronto, Ontario

Section 78 — Marinas, yacht clubs, marine wharves, structures, and fishing harbours

J. LeBlanc (<i>Chair</i>)	Department of Public Safety, Moncton, New Brunswick
R.M. Branch	Department of Public Safety, Bathurst, New Brunswick
W.J. Burr	Burr and Associates, Campbell River, British Columbia
A. Donaldson	Ontario Marine Operators Association, Penetanguishene, Ontario
K. McCormick	Electrical Safety Authority, Cobourg, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
M. Mosher	Government of Newfoundland and Labrador, St. John's, Newfoundland and Labrador
M. Vollmer	Michael Vollmer Yacht Design Inc., Burlington, Ontario

Section 80 — Cathodic protection

D.R.A. MacLeod (<i>Chair</i>)	Department of Labour and Advanced Education, Halifax, Nova Scotia
R.J. Maynard	Aurora Corrosion Control, Calgary, Alberta
W.G. McMullan	Winnipeg, Manitoba
S. Paulsen	CSA International, Toronto, Ontario
D. Schill	SaskPower, Yorkton, Saskatchewan (<i>Representing International Association of Electrical Inspectors</i>)
R. Stromer	Imperial Oil Resources, Calgary, Alberta
A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia
R.G. Wakelin	Gull River Engineering Inc., Brooklin, Ontario

Section 82 — Closed-loop and pre-closed-loop power distribution

J. Zulak (<i>Chair</i>)	National Defence Headquarters, Ottawa, Ontario
P. Desilets	Leviton Manufacturing of Canada Limited, Pointe-Claire, Québec
D. Juden	C.C.G., Ottawa, Ontario
S. Paulsen	CSA International, Toronto, Ontario
D. Pilon	SaskPower Electrical Inspections, Saskatoon, Saskatchewan (<i>Representing International Association of Electrical Inspectors</i>)

Section 84 — Interconnection of electric power production sources

F.L. Kaempffer (<i>Chair</i>)	BC Hydro, Burnaby, British Columbia
M.S. Anderson	SaskPower, Regina, Saskatchewan
D. Desrosiers	CYME International T&D, Saint-Bruno, Québec
E.P. Dick	Electric Power Diagnostics, Toronto, Ontario
D.J. Heron	Electrical Safety Authority, Sudbury, Ontario
B. Lipson	Stantec Consulting Ltd., Vancouver, British Columbia
A. Mak	WorleyParsons Canada, Edmonton, Alberta
S. Martel	Natural Resources Canada, Varennes, Québec
D. Mascarenhas	Brampton, Ontario
S. Paulsen	CSA International, Toronto, Ontario
J.C. Potts	QPS Evaluation Services Inc., Ottawa, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
V.G. Rowe	Marex Canada Limited, Nanaimo, British Columbia
T. Simmons	British Columbia Institute of Technology, Burnaby, British Columbia

Section 86 — Electric vehicle charging systems

T.W. Odell (<i>Chair</i>)	Toronto Hydro–Electric System Limited, Toronto, Ontario
P. Desilets (<i>Vice-Chair</i>)	Leviton Manufacturing of Canada Limited, Pointe-Claire, Québec
D. Chandler	Vancouver Electric Vehicle Association, Vancouver, British Columbia
S. Dallas	Toronto Electric — Electric Mobility Canada, Toronto, Ontario
P. Hinse	University of Ontario Institute of Technology, Oshawa, Ontario
D. Mascarenhas	Brampton, Ontario
T. Olechna	Electrical Safety Authority, Mississauga, Ontario
S. Paulsen	CSA International, Toronto, Ontario
J.C. Potts	QPS Evaluation Services Inc., Ottawa, Ontario (<i>Representing International Association of Electrical Inspectors</i>)
C. Schlotzhauer	General Motors of Canada Limited, Oshawa, Ontario
A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia

Appendix C

A.Z. Tsisserev (<i>Chair</i>)	Stantec Consulting Ltd., Vancouver, British Columbia
S.W. Douglas (<i>Vice-Chair</i>)	International Association of Electrical Inspectors, Toronto, Ontario
P. Desilets	Leviton Manufacturing of Canada Limited, Pointe-Claire, Québec
F.L. Kaempffer	BC Hydro, Burnaby, British Columbia
G. Montminy	Régie du bâtiment du Québec, Québec, Québec
T. Simmons	British Columbia Institute of Technology, Burnaby, British Columbia
M. Smith	Rockwell Automation Canada Inc. Control Systems, Cambridge, Ontario

Appendix D

B.F. O'Connell (<i>Chair</i>)	Tyco Thermal Controls (Canada) Ltd., Trenton, Ontario
S.W. Douglas	International Association of Electrical Inspectors, Toronto, Ontario
S. Paulsen	CSA International, Toronto, Ontario
A.Z. Tsisserev	Stantec Consulting Ltd., Vancouver, British Columbia

Appendix E

V.G. Rowe (<i>Chair</i>)	Marex Canada Limited, Nanaimo, British Columbia
----------------------------	---

Appendix F

V.G. Rowe (<i>Chair</i>)	Marex Canada Limited, Nanaimo, British Columbia
----------------------------	---

Appendix G

A.Z. Tsisserev (<i>Chair</i>)	Stantec Consulting Ltd., Vancouver, British Columbia
---------------------------------	--

Appendix H

V.G. Rowe (<i>Chair</i>)	Marex Canada Limited, Nanaimo, British Columbia
----------------------------	---

Appendix J

Annex J18

V.G. Rowe (<i>Chair</i>)	Marex Canada Limited, Nanaimo, British Columbia
----------------------------	---

Annex J20

M.K. Shea (<i>Chair</i>)	City of Victoria, British Columbia
----------------------------	------------------------------------

Δ

Preface

This twenty-second edition of the *Canadian Electrical Code, Part I*, was approved by the Committee on the *Canadian Electrical Code, Part I*, and by the Regulatory Authority Committee at their June 2011 meetings in Victoria, British Columbia. This twenty-second edition supersedes the previous editions, published in 2009, 2006, 2002, 1998, 1994, 1990, 1986, 1982, 1978, 1975, 1972, 1969, 1966, 1962, 1958, 1953, 1947, 1939, 1935, 1930, and 1927.

A new Section 64 has been added to cover requirements for renewable energy systems, and major updates have been made to Section 50 on solar photovoltaic systems. Section 48 has been deleted, and some of its requirements have been transferred to Section 26.

Several new conductor types and wiring methods have been recognized, and there are significant changes in the Rules and Tables governing ampacity calculations. Grounding and bonding requirements have been revised, and new requirements have been added for tamper-resistant receptacles and receptacles exposed to the weather.

In several sections, Rules applicable to electric vehicle charging infrastructure have been added or revised. Substantial changes have also been made to requirements for hazardous locations and electric heating.

General arrangement

The Code is divided into numbered Sections, each covering some main division of the work. Sections 0 to 16 and 26 are considered general Sections, and the other Sections supplement or amend the general Sections. The Sections are divided into numbered Rules, with captions for easy reference, as follows:

- (a) **Numbering system** — With the exception of Section 38, even numbers have been used throughout to identify Sections and Rules. Rule numbers consist of the Section number separated by a hyphen from the 3- or 4-digit figure. The intention in general is that odd numbers may be used for new Rules required by interim revisions. Due to the introduction of some new Rules and the deletion of some existing Rules during the revision of each edition, the Rule numbers for any particular requirement are not always the same in successive editions.
- (b) **Subdivision of Rules** — Rules are subdivided in the manner illustrated by Rules 8-204 and 8-206, and the subdivisions are identified as follows:

00-000	Rule
(1)	Subrule
(a)	Item
(i)	Item
(A)	Item

- (c) **Reference to other Rules, etc.** — Where reference is made to two or more Rules (e.g., Rules 10-200 to 10-206), the first and last Rules mentioned are included in the reference. Where reference is made to a Subrule or Item in the same Rule, only the Subrule number and/or Item letter and the word “Subrule” or “Item” need be mentioned. If the reference is to another Rule or Section, then the Rule number and the word “Rule” shall be stated (e.g., “Rule 10-200(3)” and not “Subrule (3) of Rule 10-200”).

The principal changes that have been made between the 2009 edition of the *Canadian Electrical Code, Part I*, and this new edition published in 2012 are marked in the text of the Code by the symbol delta (Δ) in the margin. Users of the Code are advised that the change markers in the text are not intended to be all-inclusive and are provided as a convenience only; such markers cannot constitute a comprehensive guide to the reorganization or revision of the Code. Care must therefore be taken not to rely on the change markers to determine the current requirements of the Code. As always, users of the Code must consider the entire Code and any local amendments.

Acknowledgement

The use of material contained in the *National Electrical Code* is acknowledged.

The history and operation of the *Canadian Electrical Code, Part I*

The preliminary work in preparing the Canadian Electrical Code began in 1920 when a special committee, appointed by the main Committee of the Canadian Engineering Standards Association, recommended its development. A third meeting of this Committee was held in June 1927 with representatives from Nova Scotia,