



CSA C22.2 No. 201:M84
National Standard of Canada
(reaffirmed 2019)



Metal-Enclosed High Voltage Busways



Standards Council of Canada
Conseil canadien des normes

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 licence 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 C22.2 No. 201:M84, Metal-Enclosed High Voltage Busways

National Standard of Canada — June 2019
Outside front cover, National Standard of Canada text, and title page.
This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Update No. 3

C22.2 No. 201-M1984

March 2015

Note: *General Instructions for CSA Group Standards are now called Updates. For information about the **Standards Update Service** or if you are missing any updates, go to shop.csa.ca or e-mail techsupport@csagroup.org.*

Title: *Metal-Enclosed High Voltage Busways* — originally published June 1984

Revisions issued: General Instruction No. 2 — August 1986

The following revisions have been formally approved and are marked by the symbol delta (Δ) in the margin on the attached replacement pages:

Revised	Clause 1.2
New	None
Deleted	None

- Update your copy by inserting these revised pages.
- Keep the pages you remove for reference.

C22.2 No. 201-M1984

Metal-Enclosed High Voltage Busways

1 Scope

1.1

This Standard applies to indoor and outdoor metal-enclosed busways for voltages from 751 V to 46 kV, inclusive, ac or dc, intended to be used in nonhazardous locations in accordance with the Rules of the Canadian Electrical Code, Part I.

Δ 1.2

This Standard includes straight bus sections, elbows, tees, adapter boxes, wall flanges, forced-cooled and nonforced-cooled busways, isolating links, and expansion joints. It includes constructions with rigid bus conductors only.

1.3

This Standard applies to busways using air as part of the insulation system but excludes gases (other than air) and solid or liquid insulation systems.

2 Definitions

2.1

The following definitions apply in this Standard:

Isolated phase busway means a busway in which each phase conductor is enclosed by an individual metal housing separated from adjacent conductor housings by an air space.

Metal-enclosed busway means an assembly of conductors with associated connections, joints, and insulating supports within a grounded metal enclosure.

Nonsegregated phase busway means a busway in which all phase conductors are in a common metal enclosure without barriers between the phases.

Segregated phase busway means a busway in which all phase conductors are in a common metal enclosure, but are segregated by metal barriers between phases.

Note: *Busways may be self-cooled, or they may be forced-cooled by means of a circulating gas or liquid.*

3 General requirements

3.1

General requirements applicable to this Standard are given in the latest issue of CSA Standard C22.2 No. 0, General requirements — Canadian Electrical Code, Part II.

3.2 Reference publications

3.2.1

Where reference is made to other publications, such reference shall be considered to refer to the latest edition and any revision(s) thereto, approved by the organization issuing that publication:

CSA Standards

C22.1-1982,

Canadian Electrical Code, Part I;

C22.2 No. 0-M1982,

General Requirements — Canadian Electrical Code, Part II;

C22.2 No. 94-1976,

Special Purpose Enclosures 2, 3, 4, and 5.

ANSI* Standard

C37.20-1974,

Switchgear Assemblies Including Metal-Enclosed Bus.

EEMAC† Standards

G8-2-1972,

Switchgear Assemblies;

G11-1-1972,

Measurement of Corona in Switchgear Assemblies.

*American National Standards Institute.

†Electrical and Electronic Manufacturers Association of Canada.

4 Construction

4.1 General

Busways shall have sufficient strength to maintain their shapes and for the covers to fit properly.

4.2 Thickness of metal

The thickness of sheet metal enclosures shall be not less than 1.69 mm if of steel and not less than 2.00 mm if of metal other than steel.

4.3 Protection against rusting

Enclosures and fittings of sheet steel shall be protected against rust both inside and outside by painting, enamelling, galvanizing, plating, or other suitable means. See CSA Standard C22.2 No. 0.

4.4 Bus conductor supports

Bus conductor supports shall be of fire-retardant, track-resistant insulating material and shall be spaced and have sufficient strength to withstand mechanical loading and to resist satisfactorily short circuit stresses.

4.5 Current-carrying parts

4.5.1

Ferrous fastening devices, if suitably protected against corrosion, shall be permitted to secure pressure wire connectors and to bolt together sections of conductors.

General Instruction No. 2

C22.2 No. 201-M1984
August 1986

CSA Standard C22.2 No. 201-M1984, Metal-Enclosed High Voltage Busways, was published in June 1984; it consisted of 21 pages, each of which was dated June 1984.

An amendment to Clause 1.2 has been formally approved and is incorporated (and identified by a vertical line in the margin) in the attached replacement pages.

CSA Standard C22.2 No. 201-M1984 now consists of the following pages:

3—8, 11—21 dated **June 1984**;

9, 10 dated **August 1986**.

These replacement pages are to be inserted into your copy of the Standard; the pages replaced should be kept for reference.

C22.2 No. 201-M1984

Metal-Enclosed High Voltage Busways

1. Scope

1.1

This Standard applies to indoor and outdoor metal-enclosed busways for voltages from 751 V to 46 kV, inclusive, ac or dc, intended to be used in nonhazardous locations in accordance with the Rules of the Canadian Electrical Code, Part I.

1.2*

This Standard includes straight bus sections, elbows, tees, adapter boxes, wall flanges, forced-cooled and nonforced-cooled busways, isolating links, and expansion joints.

It includes constructions with rigid bus or cable type conductors.

***Effective Date**—August 31, 1986

1.3

This Standard applies to busways using air as part of the insulation system but excludes gases (other than air) and solid or liquid insulation systems.

2. Definitions

2.1

The following definitions apply in this Standard:

Isolated phase busway means a busway in which each phase conductor is enclosed by an individual metal housing separated from adjacent conductor housings by an air space.

Metal-enclosed busway means an assembly of conductors with associated connections, joints, and insulating supports within a grounded metal enclosure.

Nonsegregated phase busway means a busway in which all phase conductors are in a common metal enclosure without barriers between the phases.

Segregated phase busway means a busway in which all phase conductors are in a common metal enclosure, but are segregated by metal barriers between phases.

Note: *Busways may be self-cooled, or they may be forced-cooled by means of a circulating gas or liquid.*

3. General Requirements

3.1

General requirements applicable to this Standard are given in the latest issue of CSA Standard C22.2 No. 0, General Requirements—Canadian Electrical Code, Part II.

3.2 Reference Publications

3.2.1

Where reference is made to other publications, such reference shall be considered to refer to the latest edition and any revision(s) thereto, approved by the organization issuing that publication:

CSA Standards

C22.1-1982,

Canadian Electrical Code, Part I;

C22.2 No. 0-M1982,

General Requirements—Canadian Electrical Code, Part II;

C22.2 No. 94-1976,

Special Purpose Enclosures 2, 3, 4, and 5.

ANSI* Standard

C37.20-1974,

Switchgear Assemblies Including Metal-Enclosed Bus.

EEMAC† Standards

G8-2-1972,

Switchgear Assemblies;

G11-1-1972,

Measurement of Corona in Switchgear Assemblies.

*American National Standards Institute.

†Electrical and Electronic Manufacturers Association of Canada.

4. Construction

4.1 General

Busways shall have sufficient strength to maintain their shapes and for the covers to fit properly.

4.2 Thickness of Metal

The thickness of sheet metal enclosures shall be not less than 1.69 mm if of steel and not less than 2.00 mm if of metal other than steel.

4.3 Protection Against Rusting

Enclosures and fittings of sheet steel shall be protected against rust both inside and outside by painting, enamelling, galvanizing, plating, or other suitable means. See CSA Standard C22.2 No. 0.

4.4 Bus Conductor Supports

Bus conductor supports shall be of fire-retardant, track-resistant insulating material and shall be spaced and have sufficient strength to withstand mechanical loading and to resist satisfactorily short circuit stresses.

4.5 Current-Carrying Parts

4.5.1

Ferrous fastening devices, if suitably protected against corrosion, shall be permitted to secure pressure wire connectors and to bolt together sections of conductors.

Standards Update Service

CSA C22.2 No. 201:M84

June 1984

Title: *Metal-Enclosed High Voltage Busways*

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

- go to store.csagroup.org
- click on **CSA Update Service**

The **List ID** that you will need to register for updates to this publication is **2001291**.

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

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

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

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

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

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

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

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



Standards Council of Canada
Conseil canadien des normes

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

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

Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users to judge its suitability for their particular purpose.

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

National Standard of Canada

CSA C22.2 No. 201:M84
***Metal-Enclosed High Voltage
Busways***



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



*Published in June 1984 by CSA Group
A not-for-profit private sector organization
178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*

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

*ICS 29.120.10
ISSN 0317-5669*

*© 1984 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 Industrial Products	4
Subcommittee on C22.2 No. 201	5
Preface	6
Foreword	7
1. Scope	9
2. Definitions	9
3. General Requirements	9
4. Construction	10
4.1 General	10
4.2 Thickness of Metal	10
4.3 Protection Against Rusting	10
4.4 Bus Conductor Supports	10
4.5 Current-Carrying Parts	10
4.6 Enclosures for Ventilated Busway	11
4.7 Electrical Spacings	11
4.8 Grounding and Bonding	12
4.9 Weatherproof Busways	12
5. Marking	12
6. Tests	13
6.1 Temperature	13
6.2 Dielectric	14
6.2.1 Dielectric Withstand Strength	14
6.2.2 Impulse	14
6.2.3 Corona Extinction	15
6.3 Resistance to Deformation	15
6.4 Bus Conductor Supports	15
Tables	16
Figure	20
Appendix A—Method of Measurement of Spacings When Insulating Barriers Are Used	21