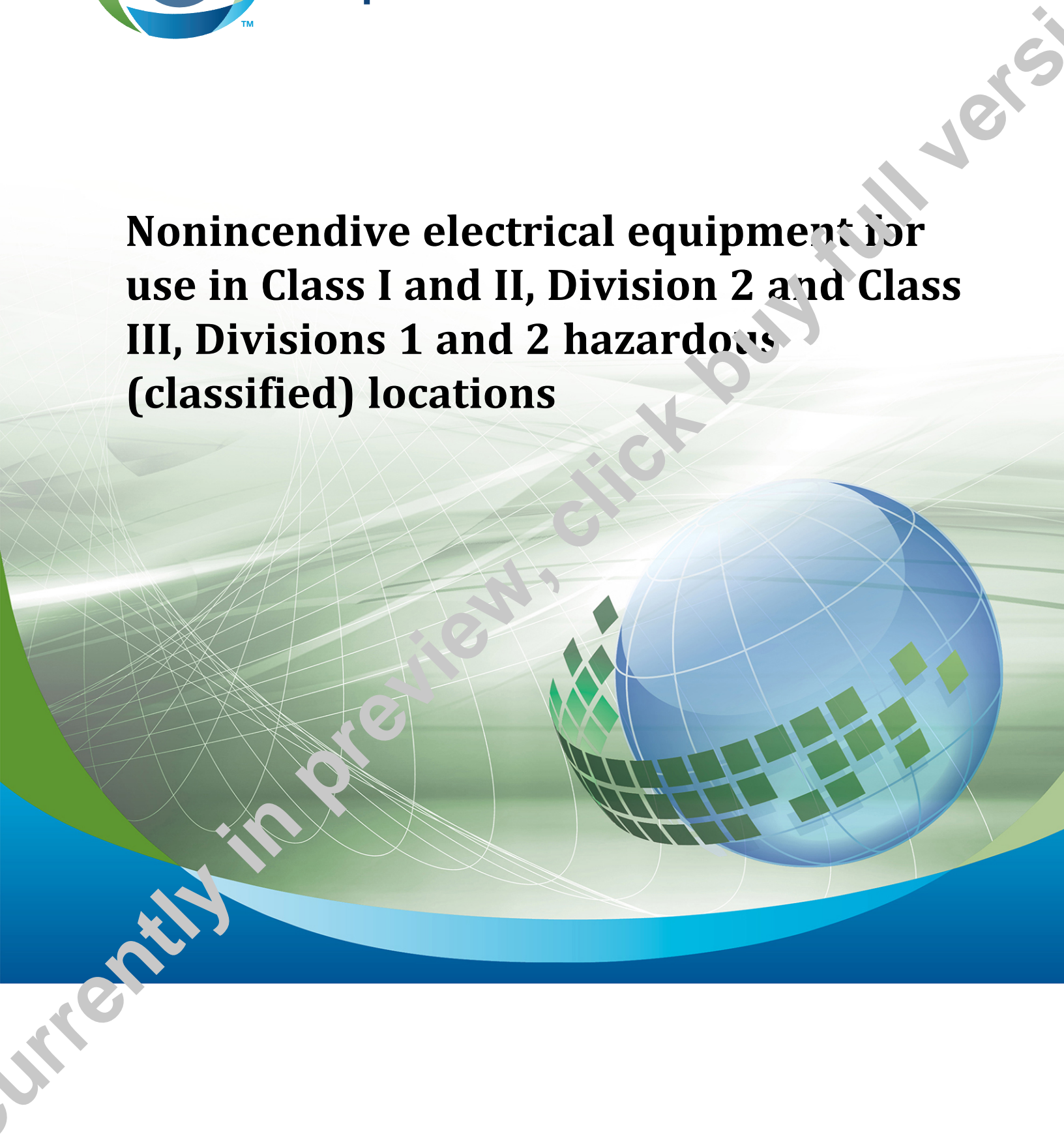




**CSA
Group**

C22.2 No. 213-16

**Nonincendive electrical equipment for
use in Class I and II, Division 2 and Class
III, Divisions 1 and 2 hazardous
(classified) locations**



Legal Notice for Standards

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

Disclaimer and exclusion of liability

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

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

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

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

Intellectual property rights and ownership

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

Patent rights

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

Authorized use of this document

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

If this document is in electronic form:

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

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

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

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

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



Standards Update Service

C22.2 No. 213-16

May 2016

Title: *Nonincendive electrical equipment for use in Class I and II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations*

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

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

The **List ID** that you will need to register for updates to this publication is **124 93**.

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.



CSA Group
CSA C22.2 No. 213-16
Second Edition



ISA
ANSI/ISA-12.12.01-2016
Seventh Edition

**Nonincendive Electrical Equipment for Use in Class I and II, Division 2
and Class III, Divisions 1 and 2 Hazardous (Classified) Locations**

May 11, 2016



ANSI/ISA-12.12.01-2016

Commitment for Amendments

This Standard is issued jointly by the Canadian Standards Association (operating as “CSA Group”) and the International Society of Automation (ISA). Comments or proposals for revisions on any part of the standard may be submitted to CSA Group. Revisions to this Standard will be made only after processing according to the standards development procedures of CSA Group. CSA Group will issue revisions to this Standard by means of a new edition or revised or additional pages bearing their date of issue. ISA will incorporate the same revisions into their edition of the standard bearing the same date of issue as the CSA pages.

CSA and ISA are separate and independent entities and each is solely responsible for its operations and business activities. The CSA trade names and trademarks depicted in this document are the sole property of the Canadian Standards Association (CSA). The ISA trade names and trademarks depicted in this document are the sole property of the International Society of Automation (ISA).

ISBN 978-1-4883-0155-1 © 2016 CSA Group

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

This Standard is subject to review five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquires@csagroup.org and include “Proposal for change” in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

To purchase CSA Group Standards and related publications, visit CSA Group’s Online Store at shop.csa.ca or call toll-free 1-800-463-6727 or 416-747-4044.

ISBN 978-1-941546-66-6 Copyright © 2016 ISA

All rights reserved. Not for resale. No part of this publication may be reproduced in any form, including an electronic retrieval system, without the prior written permission of ISA.

Contents

CSA Technical Committee on Industrial Products	4
Integrated Committee on Hazardous Location Products	6
Preface	9
1 Scope	10
1.1 Purpose	10
1.2 Applicable to Class I and II, Division 2 and Class III, Divisions 1 and 2 locations	10
1.3 Applicable to associated nonincendive field wiring apparatus	11
1.4 Applicable ambient conditions	11
1.5 Not applicable to specified ignition mechanisms	11
1.6 Not applicable to specific products	11
2 Reference publications	11
3 Definitions	12
4 General requirements	17
4.1 Requirements based upon normal operating conditions	17
4.2 General-purpose requirements	17
4.3 Consideration of subsequent conditions following nonincendive field wiring faults	17
4.4 Additional requirements	17
4.5 Component standards	17
5 Requirements for Class I, Division 2 equipment	17
5.1 Normal operation of equipment	17
5.2 Enclosures	18
5.3 Fuses used in circuits subject to overloading	18
5.4 Fuses replaceable from outside of the enclosure	18
5.5 Circuit breakers	18
5.6 Batteries and battery-powered equipment	18
6 Requirements for Class I, Division 2, Class III, Divisions 1 and 2 equipment	19
6.1 Protection methods for make/break components	19
6.2 Portable battery-powered equipment	19
6.3 Thermal ignition	19
6.4 Gasket and seal specification	19
7 Nonincendive circuits and nonincendive field wiring	20
7.1 Spark ignition evaluation	20
7.2 Nonincendive circuit evaluation	20
7.3 Evaluation by analysis	20
7.4 Associated nonincendive field wiring apparatus	21
7.5 Nonincendive field wiring apparatus	21
7.6 Nonincendive field wiring circuit	21

7.7 Interconnection of nonincendive field wiring apparatus with associated nonincendive field wiring apparatus 21

8 Normally nonarcing components 22

- 8.1 Components considered as nonarcing in normal operation 22
- 8.2 Connectors and plug-in components 22
- 8.3 Plug-in fuses that can be replaced in normal operating conditions 22
- 8.4 Circuit breakers 22
- 8.5 Lamps 22
- 8.6 Connectors 22
- 8.7 Manually operated components 23
- 8.8 Connections on exterior of enclosure used in a Class I, Division 2 hazardous location 23

9 Marking 24

- 9.1 General-purpose marking 24
- 9.2 Hazardous location related marking 24
- 9.3 Information for battery-powered equipment 26
- 9.4 Nonincendive field wiring connections 26
 - 9.4.3 Nonincendive field wiring apparatus 26
- 9.5 Optional zone marking 27
- 9.6 Alternate use of Division parameter designations for nonincendive field wiring 28
- 9.7 Connectors and lampholders 29
- 9.8 Fuseholders 29
- 9.9 Circuit breakers 29
- 9.10 External plugs and sockets 29
- 9.11 Warning markings 29

10 Surface temperature requirements 29

- 10.1 Determination of maximum surface temperature 29
- 10.2 Surface temperature 30
- 10.3 Surface temperature of small components 30

11 Spark ignition testing of nonincendive circuits 31

- 11.1 Spark test apparatus 31
- 11.2 Ignition test conditions 31

12 Evaluation of nonincendive components 32

- 12.1 Ratings, preconditioning and test for nonincendive components 32
- 12.2 Spark ignition test for nonincendive components 32

13 Evaluation of sealed devices 33

- 13.1 Ratings, construction, preconditioning, and test for sealed devices 33
- 13.2 Air leakage test 34

14 Evaluation of enclosed-break devices 34

- 14.1 Ratings, construction, preconditioning, and test for enclosed-break devices 34
- 14.2 Tests for enclosed-break devices 35

15 Enclosure ingress protection for Class II and III 35

- 15.1 Construction and tests for enclosures 35

15.2	Dust-blast method	36
15.3	Circulating dust method	36
15.4	Atomized-water method	37
15.5	Gasket test	37
15.6	Temperature aging	38
16	Drop tests and impact tests	38
16.1	Portable equipment	38
16.2	Drop test for portable equipment	38
16.3	Impact test for fixed or stationary equipment used in Class I locations	39
16.4	Impact test for fixed or stationary equipment used in Class II or Class III locations	39
17	Manufacturer's instructions	39
17.1	Information in addition to that required by general-purpose standards	39
17.2	Equipment with connections on exterior of enclosure	39
17.3	Information for equipment with nonincendive field wiring connections	39
17.4	Information for equipment repair	40
17.5	Information for equipment containing nonincendive components	40

Annex A (Normative)	— Normative references	41
Annex B (Normative)	— Standards for components — Safety requirements for electrical equipment	44
Annex C (Informative)	— Suggested warnings with French equivalent	50

Preface

This is the harmonized CSA and ISA standard for nonincendive electrical equipment, *Nonincendive electrical equipment for use in Class I and II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations*. It is the second edition of CSA C22.2 No. 213 and the seventh edition of ISA 12.12.01. This edition of CSA C22.2 No. 213 replaces the previous edition published in 1987. This edition of ISA 12.12.01 replaces the previous edition published in 2013.

This harmonized standard was prepared by CSA Group and International Society of Automation (ISA).

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

This Standard was reviewed by the CSA Integrated Committee on Hazardous Location Products, under the jurisdiction of the CSA Technical Committee on Industrial Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the Technical Committee.

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

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

Level of harmonization

This Standard uses the IEC format but is not based on, nor is it to be considered equivalent to, an IEC standard. This standard is published as an equivalent standard for CSA and ISA.

An equivalent standard is a standard that is substantially the same in technical content, except as follows: Technical national differences are allowed for codes and governmental regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate. Presentation is word for word except for editorial changes.

Reasons for differences from IEC

This Standard provides requirements for nonincendive electrical equipment in accordance with the codes of Canada and the United States. At present there is no IEC standard for electric motors and generators for use in accordance with these codes. Therefore, this Standard does not employ any IEC standard for basic requirements.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

ANSI/ISA-12.12.01-2016 • CSA C22.2 No. 213-16 Nonincendive electrical equipment for use in Class I and II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations

1 Scope

1.1 Purpose

The purpose of this Standard is to provide minimum requirements for the design, construction, and marking of electrical equipment or parts of such equipment for use in Class I and Class II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations.

This equipment, in normal operation, is not capable of causing ignition of the surrounding atmosphere under the conditions prescribed in this Standard, although the equipment could contain electronic components used in an incendive circuit and could also have field wiring that is an incendive circuit.

In addition, it is the intent of this document to establish conformity in test methods for determining the suitability of the equipment and associated circuits and components as they relate to potential ignition of a specific flammable gas or vapor-in-air mixture, combustible dust, easily ignitable fibers, or flyings.

1.2 Applicable to Class I and II, Division 2 and Class III, Divisions 1 and 2 locations

This Standard applies only to equipment, circuits, and components for use in Class I and II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations as defined in the *National Electrical Code*® (NEC®), ANSI/NFPA 70, or in the *Canadian Electrical Code, Part I* (CE Code Part I), CSA C22.1.

Notes:

- 1) Some equipment designed for use in unclassified locations is permitted by the NEC® or CE Code Part I for installation in Division 2 locations. The judgment of acceptability for the installation would be determined by the authority having jurisdiction. Such equipment would not have the hazardous location marking or documentation described in this Standard. It is anticipated that such equipment would comply with the other requirements in this Standard and that the determination of compliance is elementary (e.g., a nonarcing instrument inside a Type 4 or Type 12 enclosure used in a Class II, Division 2 location).
- 2) Throughout this Standard, references to CAN/CSA-C22.2 No. 60079-0 and ANSI/ISA 60079-0 are made as "CAN/CSA 60079-0". Similarly, references to CAN/CSA-C22.2 No. 60079-1 and ANSI/ISA 60079-1 are made as "CAN/CSA 60079-1", references to CAN/CSA-C22.2 No. 60079-11 and ANSI/ISA 60079-11 are made as "CAN/CSA 60079-11", and references to CAN/CSA-C22.2 No. 60079-15 and ANSI/ISA 60079-15 are made as "CAN/CSA 60079-15".
- 3) The US and Canadian adoptions of IEC 60079-0, IEC 60079-1, IEC 60079-11 and IEC 60079-15 could be adopted at different revision levels and may have different National Deviations.

1.3 Applicable to associated nonincendive field wiring apparatus

This standard also applies to associated nonincendive field wiring apparatus located in a non-hazardous (unclassified) location specifically designed to directly connect to nonincendive field wiring in Class I and II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations.

Note: *The 2015 CE Code Part I does not address nonincendive field wiring circuits in Class II or Class III hazardous locations.*

1.4 Applicable ambient conditions

The requirements of this Standard are based on consideration of the following ambient conditions:

- a) a lower ambient temperature of -50 °C or higher;
- b) an upper ambient temperature of 40 °C or lower;
- c) an oxygen concentration of not greater than 21 percent by volume; and
- d) a pressure of 80 kPa (0.8 bar) to 110 kPa (1.1 bar).

Note: *Equipment specified for atmospheric conditions beyond the above limits could be subject to additional investigation.*

1.5 Not applicable to specified ignition mechanisms

This standard is not applicable to mechanisms of ignition from external sources, such as static electricity or lightning, that are not related to the electrical characteristics of the equipment.

1.6 Not applicable to specific products

This standard does not apply to electric luminaires for use in Division 2 hazardous (classified) locations.

This standard does not apply to electric motors, electric heaters, heat tracing cables, and similar heat-producing products, except where they are an integral part of the equipment under evaluation, for use in Division 2 locations. Where electric motors, electric heaters, heat tracing cables, or similar heat-producing products are an integral part of the equipment under evaluation, applicable requirements from the Division 2 hazardous locations standards for these products shall be considered.

In the United States, this Standard does not apply to battery-operated flashlights and lanterns within the scope of ANSI/UL 783.

2 Reference publications

Products covered by this Standard shall comply with the referenced installation codes and standards noted in Annex A as appropriate for the country where the product is to be used. When the product is intended for use in more than one country, the product shall comply with the installation codes and standards for all countries where it is intended to be used.

2.1

Where reference is made to any Standards, such reference shall be considered to refer to the latest editions and revisions thereto available at the time of printing, unless otherwise specified.