CSA GROUP™

CSA C22.2 No. 60974-1:19
(IEC 60974-1:2017, MOD)
National Standard of Canada

CSA C22.2 No. 60974-1:19
Arc welding equipment — Part 1: Welding power sources
(IEC 60974-1:2017, MOD)

IEC

Standards Council of Canada
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Standards Update Service

CSA C22.2 No. 60974-1:19
December 2019

Title: *Arc welding equipment — Part 1: Welding power sources*

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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.

National Standard of Canada

CSA C22.2 No. 60974-1:19
Arc welding equipment — Part 1: Welding power sources
(IEC 60974-1:2017, MOD)

Note: *For brevity, this Standard will be referred to as "CAN/CSA-C22.2 No. 60974-1" throughout.*

DECEMBER 13, 2019

This national standard is based on publication IEC 60974-1, fifth edition (2017).

Prepared by
International Electrotechnical Commission

Reviewed by

Association of Standardization and Certification
NMX-J-038-1-ANCE-2019, Section 1
First Edition

CSA Group
CSA C22.2 No. 60974-1:19
First Edition
(IEC 60974-1:2017, MOD)

National Electrical Manufacturers Association
ANSI/NEMA/IEC 60974-1-2019
Second Edition

ICS 25.160.30

ANSI/NEMA/IEC 60974-1-2019

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This standard is issued jointly by the Association of Standardization and Certification (ANCE), the Canadian Standards Association (operating as "CSA Group"), and the National Electrical Manufacturers Association (NEMA). Comments or proposals for revisions on any part of the standard may be submitted to ANCE, CSA Group, or NEMA at any time. Revisions to this standard will be made only after processing according to the standards development procedures of ANCE, CSA Group, and NEMA. CSA Group and NEMA will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue. ANCE will incorporate the same revisions into a new edition of the standard bearing the same date of issue as the CSA Group and NEMA pages.

ISBN 978-1-4883-1645-6 © 2019 Canadian Standards Association

This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. The technical content of IEC and ISO publications is kept under constant review by IEC and ISO. To submit a proposal for change, please send the following information to inquiries@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.

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Preface

This is the harmonized ANCE, CSA Group, and NEMA standard for Arc Welding Equipment — Part 1: Welding Power Sources. It is the first edition of NMX-J-038-1-ANCE; Section 1, the first edition of CSA C22.2 No. 60974-1, and the second edition of ANSI/NEMA/IEC 60974-1. This edition of CSA C22.2 No. 60974-1 replaces CAN/CSA-E60974-1:12 (adopted IEC 60974-1:2012) and CSA C22.2 No. 60-M1990.

This harmonized standard is based on IEC publication 60974-1: fifth edition, *Arc welding equipment — Part 1: Welding power sources*, issued February 2017. IEC 60974-1 is copyrighted by the IEC.

This harmonized standard was prepared by the Association of Standardization and Certification (ANCE), CSA Group, and the National Electrical Manufacturers Association (NEMA). The efforts and support of Industry Associations [Cámara Nacional de Manufacturas Eléctricas (CANAME)], and of the Technical Harmonization Committee (THC 38) of the Council on the Harmonization of Electrotechnical Standards of the Nations of the Americas (CANENA), are gratefully acknowledged.

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

This standard was reviewed by the Standardization Committee of the Association of Standardization and Certification, A. C., CONANCE, committee integrated based on the terms of the Federal Law on Metrology and Standardization for developing, approving, and reviewing Mexican Standards, in the framework of the principles of representativeness, balance, and consensus. In accordance with the CONANCE operative procedure, the consensus is the general agreement, characterized by the absence of opposition based on relevant aspects by any party directly affected, after a process of analysis to consider the points of view of all parties involved and conflicting arguments reconciliation.

This standard was reviewed by the CSA Subcommittee on Arc Welding Equipment, 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 CSA Technical Committee.

In Canada, for general information on the Standards of the *Canadian Electrical Code, Part II,* see the preface of CAN/CSA-C22.2 No. 0.

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. This Standard has been approved by the American National Standards Institute (ANSI) as an American National Standard. This American National Standard is an adoption of IEC 60974-1 edition 5, *Arc Welding Equipment — Part 1: Welding Power Sources*, and was developed and approved in accordance with procedures set forth by the American National Standards Institute.

This standard was processed and approved by the Accredited Standards Committee W1. Committee approval does not necessarily imply that all Committee members voted for its approval. At the time this standard was published, Accredited Standards Committee W1 consisted of the following members:

John Freudenberg, Chairman Mike Madsen, Vice Chairman Greg Corban, Vice Chairman Khaled Masri, Secretary	
Organization Represented	*Name of Representative*
American Welding Society	David Werba — principal Andrew Davis — alternate
CenterLine (Windsor) Limited	David Beneteau
CSA Group	Lorenzo Tiracchia — principal Jean-Pierre Boivin — principal Sam Zaffino — alternate
ESAB Welding and Cutting	Carlos de Lima – principal
Hypertherm, Inc.	Gregory Corban — principal Patrick Salas — alternate
Intertek	Peter Sedor — principal Amanda Dotten — alternate
Lincoln Electric Company	Samir Farah — principal Frank Stupczyk — alternate
Miller Electric Manufacturing LLC	Mike Madsen — principal Terry Christianson-Plato — alternate
Northeast Product Safety Society	John Freudenberg
UL LLC	Chris Doty

Application of Standard

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 adopts the IEC text with national differences.

This standard is published as an equivalent standard for ANCE, CSA Group, and NEMA. 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.

All national differences from the IEC text are included in the ANCE, CSA Group, and NEMA versions of the standard. While the technical content is the same in each organization's version, the format and presentation may differ.

It is the intent and objective of the USA, Canadian, and Mexican SDOs and associated Industries to avoid the use of single country deviations to the greatest extent possible and practical. Single country deviations should only be used as a last resort when all other options have been explored. Further this includes a commitment to review and reconsider any and all single country revisions at each revision cycle with the intent of finding solutions to remove the single county deviation in the spirit of trinational harmonization. A list of work item requests will be recorded between revision cycles and by default removal of all single country deviations will be on the list for the next revision cycle.

Reasons for differences from IEC

National Differences from the IEC are being added in order to address regulatory and safety situations present in Canada, Mexico, and the USA.

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 literal interpretation 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.

ANCE effective date

The effective date for ANCE will be announced through the Diario Oficial de la Federación (Official Gazette) and is indicated on the cover page.

NEMA effective date

This NEMA effective date is a recommendation of the ANSI Accredited Standards Committee W1 and is not part of this Standard. This Standard cancels and replaces ANSI/IEC 60974-1:2008 (published December 30, 2008) on the effective date. The effective date for all new product submittals to this Standard is three (3) years after the publication date of this Standard.

The requirements in this Standard should be used for new product submittals made after the publication date of this Standard. If this Standard is used, a product will be evaluated under all of the requirements of this Standard. If a product within the scope of this Standard was listed to ANSI/IEC 60974-1:2008, compliance with all the requirements in this Standard will be required as a condition of continued Listing after December 31, 2032. If a product within the scope of this Standard was listed to ANSI/UL 60974-1 or ANSI/UL 551, compliance with all the requirements in this Standard will be required as a condition of continued Listing after June 30, 2023.

A product Listed to a previous standard can continue to be Listed until the standard's sunset date (either June 30, 2023 or December 31, 2032, as noted above) if there are only minor changes to the product's construction and all other requirements of the certification body have been met. In general, a minor change will not require a complete sequence of testing. Examples of minor changes include use of an alternate enclosure polymeric material, use of an alternate electrical component such as a relay or switch, and use of an alternate manufacturer for a material or component.

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NATIONAL DIFFERENCES

In the ANCE, CSA Group, and NEMA publications of this standard, National Differences from the text of International Electrotechnical Commission (IEC) Publication 60974-1, *Arc welding equipment — Part 1: Welding power sources*, copyright 2017, are indicated by notations (differences) and are presented in bold text. The national difference type is included in the body.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

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ARC WELDING EQUIPMENT —

Part 1: Welding power sources

FOREWORD

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International Standard IEC 60974-1 has been prepared by IEC technical committee 26: Electric welding.

This fifth edition cancels and replaces the fourth edition published in 2012 and constitutes a technical revision.

The significant changes with respect to the previous edition are the following:

– improvement of Figure 1 (6.1.1);
– modification of Table 3 (6.1.4);
– description of energy efficiency measurements in Annex M;
– inclusion of battery supplied welding power sources in the scope. Requirements therefore are described in Annex O.

The text of this standard is based on the following documents:

FDIS	Report on voting
26/610/FDIS	26/613/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this standard, the following print types are used:

– conformity statements: in *italic* type.

– terms defined in Clause 3: in **bold** type.

A list of all parts of the IEC 60974 series can be found, under the general title *Arc welding equipment*, on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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DV.1 DE *Modify the Foreword by adding the following:*

The numbering system in this standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

ARC WELDING EQUIPMENT –

Part 1: Welding power sources

1 Scope

This part of IEC 60974 is applicable to power sources for arc welding and allied processes designed for **industrial and professional use**, and supplied by a voltage not exceeding 1 000 V, battery supplied or driven by mechanical means.

This document specifies safety and performance requirements of welding power sources and **plasma cutting systems**.

This document is not applicable to limited duty arc welding and cutting power sources which are designed mainly for use by laymen and designed in accordance with IEC 60974-6.

1DV.1 D2 ***Modify Clause 1 by replacing the third paragraph with the following:***

Welding equipment that has been designed to comply with this standard and is intended for industrial and professional use, and that meets all the scope limitations of the trinational adoption of IEC 60974-6 is suitable for use by laypersons provided the additional instructions and markings requirements of the trinational adoption of IEC 60974-6 are met.

1DV.2 DR ***Modification to Clause 1 by adding the following:***

This equipment is intended for installation in accordance with the national installation codes for use in ordinary locations. See Annex DVA, Table DVA.3, Ref. No. 1.

This document includes requirements for battery-powered welding power sources and battery packs, which are given in Annex O.

This document is not applicable to testing of power sources during periodic maintenance or after repair.

NOTE 1 Typical allied processes are electric arc cutting and arc spraying.

NOTE 2 AC systems having a nominal voltage between 100 V and 1 000 V are given in Table 1 of IEC 60038:2009.

NOTE 3 This document does not include electromagnetic compatibility (EMC) requirements.

1DV.3 D2 ***Modification to Clause 1 by adding the following:***

In Canada, products covered by the scope of this Standard are also subject to the requirements of Annex DVA, Table DVA.3, Ref. No. 15.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-151, *International Electrotechnical Vocabulary – Part 151: Electrical and magnetic devices* (available at: http://www.electropedia.org)