

### Approved as an American National Standard ANSI Approval Date: July 10, 2020 (reaffirmation of ANSI/NEMA/IEC 60974-11-2009)

ANSI/NEMA/IEC 60974-11-2009 (R2020)

Arc Welding Equipment— Part 11: Electrode Holders

Published by

National Electrical Manufacturers Association 1300 North 17th Street, Suite 900 Rosslyn, Virginia 22209

www.nema.org

© 2020 National Electrical Manufacturers Association. All rights including translation into other languages, reserved under the Universal Copyright Convention, the Berne Convention for the Protection of Literary and Artistic Works, and the International and Pan American Copyright Conventions. These materials are subject to copyright claims of IEC, ANSI, and NEMA. 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 NEMA. All requests pertaining to the ANSI/NEMA Standard should be submitted to NEMA.

#### NOTICE AND DISCLAIMER

The information in this publication was considered technically sound by the consensus of persons engaged in the development and approval of the document at the time it was developed. Consensus does not necessarily mean that there is unanimous agreement among every person participating in the development of this document.

The National Electrical Manufacturers Association (NEMA) standards and guideline publications, of which the document contained herein is one, are developed through a voluntary consensus standards development process. This process brings together volunteers and/or seeks out the views of persons who have an interest in the topic covered by this publication. NEMA does not write the document and it does not independently test, evaluate, or verify the accuracy or completeness of any information or the soundness of any judgments contained in its standards and guideline publications.

NEMA disclaims liability for any personal injury, property, or other damages of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, application, or reliance on this document. NEMA disclaims and makes no guaranty or warranty, expressed or implied, as to the accuracy or completeness of any information published herein, and disclaims and makes no warranty that the information in this document will fulfill any of your particular purposes or needs. NEMA does not undertake to guarantee the performance of any individual manufacturer or seller's products or services by virtue of this standard or guide.

In publishing and making this document available, NEMA is not undertaking to render professional or other services for or on behalf of any person or entity, nor is NEMA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances. Information and other standards on the topic covered by this publication may be available from other sources, which the user may wish to consult for additional views or information not covered by this publication.

NEMA has no power, nor does it undertake to police or enforce compliance with the contents of this document. NEMA does not certify, test, or inspect products, designs, or installations for safety or health purposes. Any certification or other statement of compliance with any health or safety-related information in this document shall not be attributable to NEMA and is solely the responsibility of the certifier or maker of the statement.

# AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

Caution Notice: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

#### Published by

# National Electrical Manufacturers Association 1300 North 17<sup>th</sup> Street, Suite 900 Rosslyn, VA 22209

© 2020 National Electrical Manufacturers Association

All rights reserved including translation into other languages, reserved under the Universal Copyright Convention, the Berne Convention for the Protection of Literary and Artistic Works, and the International and Pan American Copyright Conventions.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Printed in the United States of America

© 2020 National Electrical Manufacturers Association

< This page intentionally left blank. >

#### FOREWORD FOR U.S. ADOPTION

This American National Standard is an adoption of IEC 60974-11, edition 2, *Arc welding equipment – Part 11: Electrode holders*, and was developed and approved in accordance with procedures set forth by the American National Standards Institute. Any reference in this standard to an IEC 60974 part is understood to mean a reference to the equivalent ANSI/NEMA/IEC 60974 part, where it exists.

ANSI/NEMA/IEC 60974-11-2009 (R2020) is a reaffirmation of ANSI/NEMA/IEC 60974-11-2009. No substantive changes were made to the document during this reaffirmation.

This standard contains all the original text from IEC 60974-11, edition 2, in addition to a number of U.S. Differences to the IEC standard that were identified by Accredited Standards Committee W1, Requirements for Apparatus Designed for Use in Arc Welding, Plasma Arc Cutting, and Allied Processes. Each U.S. Difference is found both in a compilation of U.S. Differences following this foreword, and inserted in the appropriate place(s) in the standard relating to the difference. Each insertion is in red text and is marked by three lines on its left (two thin, one thick). Each difference is identified with the following format:

[Clause/Subclause Number]DV[Number of Difference for the Given Clause/Subclause]

Following this format, the example 17.1DV.3 signifies that it is the third U.S. Difference to subclause 17.1.

Suggestions for the improvement of this standard are welcome and should be submitted to the Secretariat of Accredited Standards Committee W1 as follows:

Khaled Masri, ASC W1 Secretary c/o National Electrical Manufacturers Association 1300 North 17th Street, Suite 900 Rosslyn, VA 22209 Fax 703-841-3226 Email khaled.masri@nema.org

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 approved, Accredited Standards Committee W1 consisted of the following members:

Greg Corban, Chair Mike Madsen, Vice-Chair Khaled Masri, Secretary

			Voting	
Name		Organization	Status	<b>Interest Category</b>
Andrew	Davis	American Welding Society	Alt. Voting	ANSI - GEN INTEREST
David	Werba	American Welding Society	Voting	ANSI - GEN INTEREST
David	Beneteau	CenterLine (Windsor) Limited	Voting	ANSI - GEN INTEREST
Jean-Pierre	Boivin	CSA Group - Certification	Voting	ANSI - USER
Ramana	Tangirala	CSA Group - Standards	Alt. Voting	ANSI - USER
Sam	Zaffino	CSA Group - Certification	Alt. Voting	ANSI - USER
Lorenzo	Tiracchia	CSA Group - Standards	Voting	ANSI - GEN INTEREST
Carlos	De Lima	ESAB Welding & Cutting Products	Voting	ANSI - PRODUCER
Gregory	Corban	Hypertherm Incorporated	Voting	ANSI - PRODUCER

<sup>© 2020</sup> National Electrical Manufacturers Association

## ANSI/NEMA/IEC 60974-11-2009 (R2020) -2-

Patrick	Salas	Hypertherm Incorporated	Alt. Voting	ANSI - PRODUCER
Tak Ming	Liu	Hypertherm Incorporated	Alt. Voting	ANSI - PRODUCER
Amanda	Dotten	Intertek	Alt. Voting	ANSI - USER
Peter	Sedor	Intertek	Voting	ANSI - USER
Samir	Farah	Lincoln Electric	Voting	ANSI - PRODUCER
Frank	Stupczy	Lincoln Electric	Alt. Voting	ANSI - PRODUCER
Terry	Christianson -Plato	Miller Electric Mfg. LLC An ITW Welding Company	Alt. Voting	ANSI - PRODUCER
Joe	Krueger	Miller Electric Mfg. LLC An ITW Welding Company	Alt. Voting	ANSI - PRODUCER
Michael	Madsen	Miller Electric Mfg. LLC An ITW Welding Company	Voting	ANSI - PRODUCER
John	Freudenberg	Northeast Product Safety Society	Voting	ANSI - GEN INTEREST
Christopher	Doty	UL LLC	Voting	ANSI - USER

#### COMPILATION OF U.S. DIFFERENCES

NOTE This section is an integral part of American National Standard ANSI/NEMA/IEC 60974-11. See the section "Foreword for U.S. Adoption" for an explanation of the format used to identify U.S. Differences.

ForewordDV.1 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.

GlobalDV.1 Throughout this document, replace the phrase "this part of IEC 60974" with "this part of ANSI/NEMA/IEC 60974"

# **CONTENTS**

FO	REWC	)RD	5		
1	Scop	e	7		
2	Normative references				
3		s and definitions			
		onmental conditions			
4					
5	Туре	tests			
	5.1	Test conditions			
	5.2	Tests sequence			
6	Desig	gnation	9		
7	Oper	ation	9		
8	Prote	ction against electric shock	.10		
	8.1	Protection against direct contact	.10		
	8.2	Insulation resistance	.10		
	8.3	Dielectric strength	.11		
9	Therr	mal rating	. 11		
	9.1	Temperature rise	.11		
	9.2	Resistance to heat	.12		
	9.3	Resistance to hot objects	.12		
10	Mech	anical requirements	.13		
	10.1	Welding cable entry	.13		
	10.2	Penetration of the welding cable insulation	.13		
	10.3	Welding cable connection	.13		
		Impact resistance			
11	Marking				
12	Instructions for use				

#### INTERNATIONAL ELECTROTECHNICAL COMMISSION

#### ARC WELDING EQUIPMENT -

#### Part 11: Electrode holders

#### **FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60974-11 has been prepared by IEC technical committee 26: Electric welding.

This second edition cancels and replaces the first edition published in 1992. This edition constitutes a technical revision.

This new edition aligns test conditions (environmental, rated current) with the other parts of the IEC 60974 series. The modification of EN 60974-11:1995 has been adopted.

This part of IEC 60974 is to be used in conjunction with IEC 60974-1.

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

FDIS	Report on voting
26/283/FDIS	26/288/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.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site 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.

#### ForewordDV.1 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 11: Electrode holders

GlobalDV.1 Throughout this document, replace the phrase "this part of IEC 60974" with "this part of ANSI/NEMA/IEC 60974"

#### 1 Scope

This part of IEC 60974 is applicable to electrode holders for manual metal arc welding with electrodes up to 10 mm in diameter.

It is not applicable to electrode holders for underwater welding.

This part of IEC 60974 specifies safety and performance requirements of electrode holders.