



Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN IEC 60974-9:2018

**Arc welding equipment - Part 9:
Installation and use**

Matériel de soudage à l'arc - Partie 9:
Installation et utilisation

Lichtbogenschweißeinrichtungen - Teil 9:
Errichten und Betreiben

06/2018



National Foreword

This European Standard EN IEC 60974-9:2018 was adopted as Luxembourgish Standard ILNAS-EN IEC 60974-9:2018.

Every interested party, which is member of an organization based in Luxembourg, can participate for FREE in the development of Luxembourgish (ILNAS), European (CEN, CENELEC) and International (ISO, IEC) standards:

- Participate in the design of standards
- Foresee future developments
- Participate in technical committee meetings

<https://portail-qualite.public.lu/fr/normes-normalisation/participer-normalisation.html>

THIS PUBLICATION IS COPYRIGHT PROTECTED

Nothing from this publication may be reproduced or utilized in any form or by any mean - electronic, mechanical, photocopying or any other data carries without prior permission!

ILNAS-EN IEC 60974-9:2018

EUROPEAN STANDARD **EN IEC 60974-9**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2018

ICS 25.160.30

Supersedes EN 60974-9:2010

English Version

**Arc welding equipment - Part 9: Installation and use
(IEC 60974-9:2018)**

Matériel de soudage à l'arc - Partie 9: Installation et
utilisation
(IEC 60974-9:2018)

Lichtbogenschweißeinrichtungen - Teil 9: Errichten und
Betreiben
(IEC 60974-9:2018)

This European Standard was approved by CENELEC on 2018-06-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 26/648/FDIS, future edition 2 of IEC 60974-9, prepared by IEC/TC 26 "Electric welding" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60974-9:2018.

The following dates are fixed:

- latest date by which the document has to be (dop) 2019-03-01
implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2021-06-01
standards conflicting with the
document have to be withdrawn

This document supersedes EN 60974-9:2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60974-9:2018 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60204-1	NOTE	Harmonized as EN 60204-1.
IEC 60364-4-41	NOTE	Harmonized as HD 60364-4-41.
IEC 60974-2	NOTE	Harmonized as EN 60974-2.
IEC 60974-3	NOTE	Harmonized as EN 60974-3.
IEC 60974-5:2013	NOTE	Harmonized as EN 60974-5:2013 (not modified).
IEC 60974-6:2015	NOTE	Harmonized as EN 60974-6:2016 (not modified).
IEC 60974-7	NOTE	Harmonized as EN 60974-7.
IEC 60974-8	NOTE	Harmonized as EN 60974-8.
IEC 60974-10	NOTE	Harmonized as EN 60974-10.
IEC 61008 Series	NOTE	Harmonized as EN 61008 Series.
IEC 61009 Series	NOTE	Harmonized as EN 61009 Series.
IEC 61140	NOTE	Harmonized as EN 61140.
IEC 62822-1:2016	NOTE	Harmonized as EN 62822-1:201X ¹ (modified).
ISO 11611	NOTE	Harmonized as EN ISO 11611.

¹ To be published.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60245-6	-	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 6: Arc welding electrode cables	-	-
IEC 60755	-	General safety requirements for residual current operated protective devices	-	-
IEC 60974-1	-	Arc welding equipment - Part 1: Welding power sources	EN 60974-1	-
IEC 60974-4	-	Arc welding equipment - Part 4: Periodic inspection and testing	EN 60974-4	-
IEC 60974-11	-	Arc welding equipment - Part 11: Electrode holders	EN 60974-11	-
IEC 60974-12	-	Arc welding equipment - Part 12: Coupling devices for welding cables	EN 60974-12	-
IEC 60974-13	-	Arc welding equipment - Part 13: Welding clamp	EN 60974-13	-



INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Arc welding equipment –
Part 9: Installation and use**

**Matériel de soudage à l'arc –
Partie 9: Installation et utilisation**

CONTENTS

FOREWORD	4
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Installation	8
4.1 General	8
4.2 Supply circuit	8
4.2.1 Selection of supply cables	8
4.2.2 Supply disconnecting device	8
4.2.3 Emergency stopping device	9
4.3 Welding circuit	9
4.3.1 Isolation from the input supply	9
4.3.2 Summation of no-load voltages	9
4.3.3 Welding cables	9
4.3.4 Connection between the welding power source and the workpiece	10
4.3.5 Earthing of the workpiece	11
4.3.6 Location of gas cylinders	11
5 Electromagnetic compatibility (EMC)	12
5.1 General	12
5.2 Assessment of area	12
5.3 Methods of reducing emissions	12
5.3.1 Public supply system	12
5.3.2 Maintenance of arc-welding equipment	12
5.3.3 Welding cables	13
5.3.4 Equipotential bonding	13
5.3.5 Earthing of the workpiece	13
5.3.6 Screening and shielding	13
6 Electromagnetic fields (EMF)	13
6.1 General	13
6.2 Assessment of exposure	14
7 Use	14
7.1 General requirements	14
7.2 Connection between several welding power sources	14
7.3 Inspection and maintenance of the welding installation	14
7.3.1 Periodical inspection	14
7.3.2 Routine inspection	15
7.4 Disconnection of welding power sources and/or welding circuits	15
7.5 Guards	15
7.6 Information for operators	15
7.7 Protective measures	15
7.7.1 Extraneous conductive parts in the welding area	15
7.7.2 Protection against electric shock	15
7.8 Isolation of the welding circuit from the workpiece and earth when not in use	16
7.9 Voltage between electrode holders or torches	16

7.10	Welding in an environment with increased risk of electric shock	18
7.11	Use of shoulder slings	18
7.12	Welding at elevated positions	19
7.13	Welding with suspended welding equipment	19
8	Battery-powered welding power sources	19
8.1	Safety recommendations	19
8.2	Transportation	19
Annex A	(informative) Hazards associated with arc welding	20
A.1	General	20
A.2	Equipment condition and maintenance	20
A.3	Operation	20
A.4	Training	20
A.5	Arc radiation	20
A.5.1	General	20
A.5.2	Eye and face protection (see also A.9)	21
A.5.3	Body protection (see also A.9)	21
A.5.4	Protection of persons in the vicinity of an arc	21
A.6	EMF	21
A.6.1	General	21
A.6.2	Body protection	21
A.6.3	Protection of persons in the vicinity of the welding operation	21
A.7	Welding fume	21
A.8	Noise	22
A.9	Fire and explosion	24
A.9.1	General	24
A.9.2	Fire	24
A.9.3	Explosion	24
A.10	General protective clothing	24
A.11	Confined spaces	24
Annex B	(informative) Voltage drops in the welding circuit	26
Bibliography	28
Figure 1	– Example of DC voltage between electrode holders or torches	17
Figure 2	– Example of AC voltage between electrode holders or torches – Single-phase supply from the same pair of lines of a three-phase mains supply	17
Figure 3	– Example of AC voltage between electrode holders or torches – Single-phase supply from different pairs of lines of a three-phase mains supply	17
Figure 4	– Example of AC voltage between electrode holders connected between different lines of output	18
Figure A.1	– Steps for the control of welding fumes	23
Figure A.2	– Example steps of operation for work in confined spaces	25
Figure B.1	– Example of MIG/MAG equipment	26
Table 1	– Current ratings for copper welding cables	10
Table B.1	– Voltage drop in copper and aluminium welding cables at normal and elevated temperatures	27