IEC 60974-9

Edition 2.0 2018-04

REDLINE VERSION

colour inside

Arc welding equipment –
Part 9: Installation and use

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.160.30

ISBN 978-2-8322-5667-1

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

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 9
4.2.1 Selection of supply cables 9
4.2.2 Supply disconnecting device 9
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 12
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 ~~hazard~~ 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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

ARC WELDING EQUIPMENT –

Part 9: Installation and use

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 co-operation 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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
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.

DISCLAIMER
This Redline version is not an official IEC Standard and is intended only to provide the user with an indication of what changes have been made to the previous version. Only the current version of the standard is to be considered the official document.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60974-9 has been prepared by IEC technical committee 26: Electric welding.

This standard cancels and replaces the first edition published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) addition of a new Clause 8;

b) addition of interpolation details in Table 1.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
26/648/FDIS	26/649/RVD

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

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

In this standard, the following print types are used:

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

A list of all the 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 document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

ARC WELDING EQUIPMENT –

Part 9: Installation and use

1 Scope

This document is applicable to requirements for installation and instructions for use of equipment for arc welding and allied processes designed in accordance with safety requirements of IEC 60974-1, IEC 60974-6 or equivalent.

This document is applicable for the guidance of instructors, operators, welders, managers, and supervisors in the safe installation and use of equipment for arc welding and allied processes and the safe performance of welding and cutting operations.

National and local regulations take precedence over this document.

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 60245-6, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 6: Arc welding electrode cables*

IEC~~/TR~~ 60755, *General requirements for residual current operated protective devices*

IEC 60974-1~~:2005~~, *Arc welding equipment – Part 1: Welding power sources*

IEC 60974-4, *Arc welding equipment – Part 4: ~~In-service~~ Periodic inspection and testing*

~~IEC 60974-6, *Arc welding equipment – Part 6: Limited duty manual metal arc welding power sources*~~

~~IEC 60974-10, *Arc welding equipment – Part 10: Electromagnetic compatibility (EMC) requirements*~~

IEC 60974-11, *Arc welding equipment – Part 11: Electrode holders*

IEC 60974-12, *Arc welding equipment – Part 12: Coupling devices for welding cables*

IEC 60974-13, *Arc welding equipment – Part 13: Welding clamp*

IEC 60974-9

Edition 2.0 2018-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Arc welding equipment – Part 9: Installation and use

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



IEC 60974-9:2018-04(en-fr)

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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

ARC WELDING EQUIPMENT –

Part 9: Installation and use

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 co-operation 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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
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 60974-9 has been prepared by IEC technical committee 26: Electric welding.

This standard cancels and replaces the first edition published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) addition of a new Clause 8;
b) addition of interpolation details in Table 1.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
26/648/FDIS	26/649/RVD

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

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

In this standard, the following print types are used:

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

A list of all the 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 document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

ARC WELDING EQUIPMENT –

Part 9: Installation and use

1 Scope

This document is applicable to requirements for installation and instructions for use of equipment for arc welding and allied processes designed in accordance with safety requirements of IEC 60974-1, IEC 60974-6 or equivalent.

This document is applicable for the guidance of instructors, operators, welders, managers, and supervisors in the safe installation and use of equipment for arc welding and allied processes and the safe performance of welding and cutting operations.

National and local regulations take precedence over this document.

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 60245-6, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 6: Arc welding electrode cables*

IEC 60755, *General requirements for residual current operated protective devices*

IEC 60974-1, *Arc welding equipment – Part 1: Welding power sources*

IEC 60974-4, *Arc welding equipment – Part 4: Periodic inspection and testing*

IEC 60974-11, *Arc welding equipment – Part 11: Electrode holders*

IEC 60974-12, *Arc welding equipment – Part 12: Coupling devices for welding cables*

IEC 60974-13, *Arc welding equipment – Part 13: Welding clamp*

SOMMAIRE

AVANT-PROPOS 33
1 Domaine d'application 35
2 Références normatives 35
3 Termes et définitions 35
4 Installation 37
4.1 Généralités 37
4.2 Circuit d'alimentation 37
4.2.1 Sélection des câbles d'alimentation 37
4.2.2 Dispositif de déconnexion de l'alimentation 38
4.2.3 Dispositif d'arrêt d'urgence 38
4.3 Circuit de soudage 38
4.3.1 Isolation par rapport à l'alimentation 38
4.3.2 Sommation des tensions à vide 38
4.3.3 Câbles de soudage 38
4.3.4 Connexion entre la source de courant de soudage et la pièce mise en œuvre 39
4.3.5 Mise à la terre de la pièce mise en œuvre 40
4.3.6 Emplacement des bouteilles de gaz 41
5 Compatibilité électromagnétique (CEM) 41
5.1 Généralités 41
5.2 Évaluation de l'emplacement 41
5.3 Méthodes de réduction des émissions 41
5.3.1 Réseau public d'alimentation 41
5.3.2 Maintenance du matériel de soudage à l'arc 41
5.3.3 Câbles de soudage 42
5.3.4 Liaison équipotentielle 42
5.3.5 Mise à la terre de la pièce mise en œuvre 42
5.3.6 Blindage et protection 42
6 Champs électromagnétiques (EMF) 42
6.1 Généralités 42
6.2 Évaluation de l'exposition 43
7 Utilisation 43
7.1 Exigences générales 43
7.2 Connexions entre plusieurs sources de courant de soudage 43
7.3 Examen et maintenance de l'installation de soudage 43
7.3.1 Examen périodique 43
7.3.2 Examen quotidien 44
7.4 Déconnexion des sources de courant de soudage et/ou des circuits de soudage 44
7.5 Dispositifs de protection 44
7.6 Information pour les opérateurs 44
7.7 Mesures de protection 44
7.7.1 Éléments conducteurs étrangers dans la zone de soudage 44
7.7.2 Protection contre les chocs électriques 45
7.8 Isolation du circuit de soudage de la pièce mise en œuvre et de la terre lorsqu'il n'est pas utilisé 45

7.9 Tension entre les porte-électrodes ou les torches 45
7.10 Soudage dans un environnement avec risque accru de choc électrique 47
7.11 Usage de bandoulières 48
7.12 Soudage en positions élevées 48
7.13 Soudage avec du matériel de soudage suspendu 48
8 Sources de courant de soudage alimentées par batteries 48
8.1 Recommandations de sécurité 48
8.2 Transport 48
Annexe A (informative) Dangers associés au soudage à l'arc 49
A.1 Généralités 49
A.2 Maintenance du matériel et conditions de fonctionnement 49
A.3 Fonctionnement 49
A.4 Formation 49
A.5 Rayonnement de l'arc 49
A.5.1 Généralités 49
A.5.2 Protection des yeux et du visage (voir aussi A.9) 49
A.5.3 Protection du corps (voir aussi A.9) 50
A.5.4 Protection des personnes au voisinage d'un arc 50
A.6 EMF 50
A.6.1 Généralités 50
A.6.2 Protection du corps 50
A.6.3 Protection des personnes au voisinage d'une opération de soudage 50
A.7 Vapeurs de soudage 50
A.8 Bruit 51
A.9 Incendie et explosion 53
A.9.1 Généralités 53
A.9.2 Incendie 53
A.9.3 Explosion 53
A.10 Vêtements standard de protection 53
A.11 Espaces confinés 53
Annexe B (informative) Chutes de tension dans le circuit de soudage 55
Bibliographie 57

Figure 1 – Exemple de tension continue entre porte-électrodes ou torches 46
Figure 2 – Exemple de tension alternative entre porte-électrodes ou torches – Alimentation monophasée provenant de la même paire de phases d'un réseau d'alimentation triphasé 46
Figure 3 – Exemple de tension alternative entre porte-électrodes ou torches – Alimentation monophasée provenant de différentes paires de phases d'un réseau d'alimentation triphasé 46
Figure 4 – Exemple de tension alternative entre porte-électrodes reliés entre différentes phases de sortie 47
Figure A.1 – Procédures pour le contrôle des vapeurs de soudage 52
Figure A.2 – Exemple de procédures à suivre pour travaux en espaces confinés 54
Figure B.1 – Exemple de matériel MIG/MAG 55

Tableau 1 – Caractéristiques assignées de courant pour les câbles de soudage en cuivre 39

Tableau B.1 – Chute de tension dans des câbles de soudage en cuivre et en aluminium à des températures normales et élevées 56

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

_____

MATÉRIEL DE SOUDAGE À L'ARC –

Partie 9: Installation et utilisation

AVANT-PROPOS

1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La norme internationale IEC 60974-9 a été établie par le Comité d'études 26 de l'IEC: Soudage électrique.

La présente norme annule et remplace la première édition parue en 2010. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) ajout d'un nouvel Article 8;
b) ajout de détails relatifs à l'interpolation au Tableau 1.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
26/648/FDIS	26/649/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Dans la présente norme, les caractères d'imprimerie suivants sont utilisés:

– les termes définis à l'Article 3: en caractère **gras**.

Une liste de toutes les parties de la série IEC 60974, sous le titre général *Matériel de soudage à l'arc*, peut être consultée sur le site internet de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

MATÉRIEL DE SOUDAGE À L'ARC –

Partie 9: Installation et utilisation

1 Domaine d'application

Le présent document est applicable aux exigences relatives à l'installation et aux instructions d'utilisation du matériel pour le soudage à l'arc et les procédés connexes conçus dans le respect des exigences de sécurité de l'IEC 60974-1, de l'IEC 60974-6 ou équivalent.

Le présent document est applicable aux recommandations destinées aux instructeurs, aux opérateurs, aux soudeurs, aux gestionnaires et aux superviseurs pour obtenir une installation et une utilisation sûres du matériel pour le soudage à l'arc et les techniques connexes et obtenir des performances sûres dans les opérations de soudage et de coupage.

Les règlementations nationales et locales prévalent sur le présent document.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60245-6, *Conducteurs et câbles isolés au caoutchouc – Tension assignée au plus égale à 450/750 V – Partie 6: Câbles souples pour électrodes de soudage à l'arc*

IEC 60755, *General requirements for residual current operated protective devices* (disponible en anglais seulement)

IEC 60974-1, *Matériel de soudage à l'arc – Partie 1: Sources de courant de soudage*

IEC 60974-4, *Matériel de soudage à l'arc – Partie 4: Inspection et essais périodiques*

IEC 60974-11, *Matériel de soudage à l'arc – Partie 11: Porte-électrodes*

IEC 60974-12, *Matériel de soudage à l'arc – Partie 12: Dispositifs de connexion pour câbles de soudage*

IEC 60974-13, *Matériel de soudage à l'arc – Partie 13: Pince de retour de courant*