IEC 60974-1

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# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

## Arc welding equipment – Part 1: Welding power sources

## Matériel de soudage à l'arc – Partie 1: Sources de courant de soudage

IEC 60974-1:2012

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# Part 1: Welding power sources

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

This fourth edition cancels and replaces the third edition published in 2005 and constitutes a technical revision.

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

– the heating test shall be carried out at ambient temperature of 40 °C (see 5.1);
– new Figure 1 summarizes example of insulation requirements;
– creepage distances for pollution degree 4 are no longer valid (see Table 2);
– insulation requirements for Class II equipment are defined (see Table 3);
– dielectric test voltage interpolation restriction lower limit is changed to 220 V and interpolation for control and welding circuit is clarified (see Table 4);
– water test is clarified by suppression of visual inspection (see 6.2.1);

– isolation requirements of the supply circuit and the welding circuit are moved in protection against electric shock in normal service (see 6.2.4);

– touch current in normal service and in single fault condition requirements are changed (see 6.2.5, 6.2.6 and 6.3.6);

– maximum temperature for insulation systems are reviewed in accordance with current edition of IEC 60085 (see Table 6);

– limits of temperature rise for external surfaces are updated depending of unintentional contact period as defined in ISO 13732-1 (see Table 7);

– loading test is completed by a dielectric test (see 7.4);

– conformity test for tolerance to supply voltage fluctuation is clarified (see 10.1);

– marking of terminals is limited to external protective conductor and three-phase equipment terminals (see 10.4);

– usage of hazard reducing device is clarified (see 11.1);

– requirements for control circuits are changed (see Clause 12);

– impact test is clarified (see 14.2.2);

– environmental parameters are completed (see Annex M).

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

| FDIS | Report on voting |
|---|---|
| 26/472/FDIS | 26/479/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.

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 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.

# 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, or driven by mechanical means.

This part of IEC 60974 specifies safety and performance requirements of welding power sources and plasma cutting systems.

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

This part of IEC 60974 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 part of IEC 60974 does not include electromagnetic compatibility (EMC) requirements.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-151:2001, *International Electrotechnical Vocabulary (IEV) – Part 151: Electrical and magnetic devices*

IEC 60050-851:2008, *International Electrotechnical Vocabulary (IEV) – Part 851: Electric welding*

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

IEC 60417-DB:2011[1], *Graphical symbols for use on equipment*

IEC 60445, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

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[1] "DB" refers to the IEC on-line database.