

Arc welding equipment —

Part 10: Electromagnetic compatibility (EMC) requirements

ICS 25.160.30

National foreword

This British Standard is the UK implementation of EN 60974-10:2007. It is identical to IEC 60974-10:2007. It supersedes BS EN 60974-10:2003 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee WEE/6, Electric arc welding equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2008

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ISBN 978 0 580 54474 3

Amendments/corrigenda issued since publication

Date	Comments

English version

**Arc welding equipment -
Part 10: Electromagnetic compatibility (EMC) requirements
(IEC 60974-10:2007)**

Matériel de soudage à l'arc -
Partie 10: Exigences relatives à la
compatibilité électromagnétique (CEM)
(CEI 60974-10:2007)

Lichtbogenschweißeinrichtungen -
Teil 10: Anforderungen an die
elektromagnetische Verträglichkeit (EMV)
(IEC 60974-10:2007)

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 26/341/CDV, future edition 2 of IEC 60974-10, prepared by IEC TC 26, Electric welding, was submitted to the IEC-CENELEC parallel Unique Acceptance Procedure and was approved by CENELEC as EN 60974-10 on 2007-12-01.

This European Standard supersedes EN 60974-10:2003.

Significant technical changes with respect to EN 60974-10:2003 are:

- application of more stringent r.f. emission limits for the idle mode;
- mandatory classification of arc starting and stabilizing devices as Class A equipment;
- additional immunity tests (surges and r.f. common-mode currents);
- inclusion of informative Annex B, containing the applicable emission limits for information of the user of the standard.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2008-09-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2010-12-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 2004/108/EC. See Annex ZZ.

Annexes ZA and ZZ have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60974-10:2007 was approved by CENELEC as a European Standard without any modification.

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ARC WELDING EQUIPMENT –

Part 10: Electromagnetic compatibility (EMC) requirements

1 Scope

This part of IEC 60974 specifies

- a) applicable standards and test methods for radio-frequency (r.f.) emissions;
- b) applicable standards and test methods for harmonic current emission, voltage fluctuations and flicker;
- c) immunity requirements and test methods for continuous and transient, conducted and radiated disturbances including electrostatic discharges.

This standard is applicable to equipment for arc welding and allied processes, including power sources and ancillary equipment, for example wire feeders, liquid cooling systems and arc striking and stabilizing devices.

NOTE 1 Allied processes are, for example, plasma cutting and arc stud welding.

NOTE 2 This standard does not specify basic safety requirements for arc welding equipment such as protection against electric shock, unsafe operation, insulation coordination and related dielectric tests.

Arc welding equipment type tested in accordance with, and which has met the requirements of, this standard is considered to be in compliance for all applications.

2 Normative references

The following referenced documents are indispensable for the application 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 60050-161, *International Electrotechnical Vocabulary – Chapter 161: Electromagnetic compatibility*

IEC 60050-851, *International Electrotechnical Vocabulary – Chapter 851: Electric welding*

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

IEC 60974-3, *Arc welding equipment – Part 3: Arc striking and stabilizing devices*

IEC 60974-6, *Arc welding equipment – Part 6: Power sources for manual metal arc welding with limited duty*

IEC 61000-3-2:2005, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

IEC 61000-3-3:1994, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current ≤ 16 A per phase and not subject to conditional connection¹*

Amendment 1 (2001)

Amendment 2 (2005)

¹ There exists a consolidated edition 1.2 (2005) that includes edition 1 and its amendments 1 and 2.

IEC/TS 61000-3-4, *Electromagnetic compatibility (EMC) – Part 3-4: Limits – Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 16 A*

IEC 61000-3-11:2000, *Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems – Equipment with rated current ≤ 75 A and subject to conditional connection*

IEC 61000-3-12:2004, *Electromagnetic compatibility (EMC) – Part 3-12: Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

CISPR 11:2003, *Industrial, scientific and medical (ISM) radio-frequency equipment – Radio disturbance characteristics – Limits and methods of measurement*

CISPR 14-1, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

CISPR 16-1-1, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

CISPR 16-1-2, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Conducted disturbances*

CISPR 16-1-4, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Radiated disturbances*

3 Terms and definitions

For the purposes of this document, the terms and definitions related to EMC and to the relevant phenomena contained in IEC 60050-161, the terms and definitions related to arc welding equipment contained in IEC 60050-851 and in IEC 60974-1, as well as the following, apply.

3.1 click

disturbance which exceeds the limit of continuous disturbance no longer than 200 ms and which is separated from a subsequent disturbance by at least 200 ms

NOTE 1 Both intervals are related to the level of the limit of continuous disturbance.

NOTE 2 A click may contain a number of impulses, in which case the relevant time is that from the beginning of the first to the end of the last impulse.

3.2

idle state

operating mode in which the power is switched on, but the welding circuit is not energized

4 General test requirements

4.1 Test conditions

Tests shall be carried out within the specified operating conditions for the apparatus, as given in IEC 60974-1 or IEC 60974-6, and at its rated supply voltage and frequency. Results obtained for r.f. emission and immunity at 50 Hz are valid for the same model operating at 60 Hz and vice versa.

4.2 Measuring instruments

The measuring equipment shall comply with the requirements of CISPR 16-1-1 and the standards referred to in Tables 1, 2 and 3 as applicable.

4.3 Artificial mains network

Measurement of the mains terminal disturbance voltage shall be made using an artificial mains network consisting of 50 Ω /50 μ H V-network as specified in CISPR 16-1-2.

The artificial network is required to provide a defined impedance at r.f. across the mains supply at the point of measurement and also to provide for isolation of the equipment under test from ambient noise on the power lines.

4.4 Voltage probe

A voltage probe shall be used when the artificial mains network cannot be used. The probe is connected sequentially between each line and the reference earth. The probe shall consist of a blocking capacitor and a resistor such that the total resistance between the line and earth is at least 1 500 Ω . The effect on the accuracy of measurement of the capacitor or any other device which may be used to protect the measuring receiver against dangerous currents shall be either less than 1 dB or allowed for in calibration.

4.5 Antennas

In the frequency range from 30 MHz to 1 GHz, the antenna(s) used shall be as specified in CISPR 16-1-4. Measurements shall be made for both horizontal and vertical polarization. The nearest point of the antenna(s) to the ground shall be not less than 0,2 m.

5 Test set-up for emission and immunity

5.1 General

Emission and immunity testing shall be carried out on equipment configured in accordance with Figure 1. Arc welding equipment tested in such a configuration shall be considered to have met the necessary requirements of this standard.

If due to the design of the arc welding equipment, these tests cannot be carried out as described, the manufacturer's recommendations (for example, temporary bypassing or disablement of control circuits) should be followed in order to match these test objectives. Any temporary changes to the arc welding equipment shall be documented.