

Arc welding equipment —

Part 7: Torches

The European Standard EN 60974-7:2005 has the status of a
British Standard

ICS 25.160

National foreword

This British Standard is the official English language version of EN 60974-7:2005. It is identical with IEC 60974-7:2005. It supersedes BS EN 60974-7:2000 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee WEE/6, Electric arc welding equipment, which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 29 and a back cover.

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English version

Arc welding equipment
Part 7: Torches
(IEC 60974-7:2005)

Matériel de soudage à l'arc
Partie 7: Torches
(CEI 60974-7:2005)

Lichtbogenschweißeinrichtungen
Teil 7: Brenner
(IEC 60974-7:2005)

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CENELEC

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

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Foreword

The text of document 26/308/FDIS, future edition 2 of IEC 60974-7, prepared by IEC TC 26, Electric welding, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60974-7 on 2005-08-01.

This part of EN 60974 is to be used in conjunction with EN 60974-1:2005.

This European Standard supersedes EN 60974-7:2000.

The main changes with respect to EN 60974-7:2000 are listed below:

- the scope includes relationship to EN 60974-1 and a note is added (see Clause 1);
- normative references are updated (see Clause 2);
- a preliminary insulation resistance test is added (see item b) of 6.2);
- TIG and plasma torches now have an arc striking and stabilizing voltage rating (see 7.1, 7.3 and item c) of Clause 13);
- a procedure to determine the arc striking and stabilizing voltage rating of plasma torches is given (see 7.3);
- requirements for plasma cutting torches are updated to harmonize with EN 60974-1:2005 (see 7.4.2);
- “Heating test for liquid cooled torches” and “Instructions for use” incorporate elements of EN 60974-2 (see 8.3 and item e) of Clause 13);
- during the heating test, the gas flow tolerance has been modified (see Tables 2, 3, 4 and 6);
- the temperature of the hot wire is maintained during the “Resistance to hot objects” test (see Clause 10);
- accessible parts shall not have sharp edges, rough surfaces or protruding parts likely to cause injury (see 11.2);
- “Instructions for use” shall contain environmental conditions (see item h) of Clause 13).

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) | 2006-05-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2008-08-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60974-7:2005 was approved by CENELEC as a European Standard without any modification.

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ARC WELDING EQUIPMENT –

Part 7: Torches

1 Scope

This part of IEC 60974 specifies safety and construction requirements for torches for arc welding and allied processes.

In this part of IEC 60974, a torch consists of the torch body, the cable-hose assembly and other components.

This part of IEC 60974 is not applicable to electrode holders for manual metal arc welding or torches for air-arc cutting/gouging.

NOTE In this part of IEC 60974, the terms "torch" and "gun" are interchangeable. For convenience "torch" has been used in the following text.

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

IEC 60050(851), *International Electrotechnical Vocabulary (IEV) – Chapter 851: Electric welding*

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

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

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

IEC 60974-2, *Arc welding equipment – Part 2: Liquid cooling systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050(151), IEC 60050(851), IEC 60664-1, and IEC 60974-1, as well as the following, apply.

NOTE Additional terminology is given in Annex A.

3.1 torch

device that conveys all services necessary to the arc for welding, cutting or allied processes (for example, current, gas, coolant, wire electrode)

3.2**gun**

torch with a handle substantially perpendicular to the torch body

3.3**torch body**

main component to which the cable-hose assembly and other components are connected

3.4**handle**

part designed to be held in the operator's hand

3.5**gas nozzle**

component at the exit end of the torch directing the shielding gas around the arc and over the weld pool

3.6**non-consumable electrode**

arc welding electrode which does not provide filler metal

3.7**wire electrode**

solid or tubular filler wire which conducts welding current

3.8**contact tip**

replaceable metal component fixed at the front end of the torch, which transfers the welding current to, and guides, the wire electrode

3.9**cable-hose assembly**

flexible assembly of cables and hoses, and their connecting elements, that delivers all necessary supplies to the torch body

3.10**manual torch**

torch held and guided by the operator's hand during its operation

3.11**mechanically guided torch**

torch fixed to, and guided by, a mechanical device during its operation

3.12**air-cooled torch**

torch cooled by the ambient air and, where appropriate, by the shielding gas

3.13**liquid-cooled torch**

torch cooled by the circulation of a cooling liquid

3.14**motorized torch**

torch incorporating means to supply motion to the wire electrode

3.15

spool-on torch

motorized torch incorporating a filler wire supply

3.16

arc striking and stabilizing voltage

voltage superimposed on the welding circuit to initiate or maintain the arc or both

3.17

filler metal

metal added during welding or allied processes

[IEV 851-04-24]

3.18

filler wire

filler metal in solid or tubular wire form which may or may not be part of the welding circuit

3.19

plasma tip

component that provides the constricting orifice through which the plasma arc passes

3.20

visual inspection

inspection by eye to verify that there are no apparent discrepancies with respect to the provisions of the standard concerned

[IEC 60974-1, 3.7]

3.21

plasma cutting system

combination of power source, torch, and associated safety devices for plasma cutting/gouging

3.22

plasma cutting power source

equipment for supplying current and voltage and having the required characteristics suitable for plasma cutting/gouging and which may supply gas and cooling liquid

NOTE A plasma cutting power source may also supply services to other equipment and auxiliaries, for example auxiliary power, cooling liquid, and gas.

[IEC 60974-1, 3.55]

4 Environmental conditions

Torches shall be capable of operation when the following environmental conditions prevail:

a) Ambient air temperature:

– during operation: –10 °C to +40 °C;

– after transport and storage: –25 °C to +55 °C;

b) Relative humidity of the air: up to 90 % at 20 °C.

NOTE Different environmental conditions may be agreed upon between the manufacturer and the purchaser. Examples of these conditions are: high humidity, unusually corrosive fumes, steam, excessive oil vapour, abnormal vibration or shock, excessive dust, severe weather conditions, unusual coastal or shipboard conditions, vermin infestation and atmospheres conducive to the growth of mold.

5 Classification

5.1 General

Torches shall be classified in accordance with

- a) the process for which they are designed, see 5.2;
- b) the method by which they are guided, see 5.3;
- c) the type of cooling, see 5.4;
- d) the method of striking the main arc for plasma processes, see 5.5.

5.2 Process

Torches can be designed for

- a) MIG/MAG welding;
- b) self-shielded flux-cored arc welding;
- c) TIG welding;
- d) plasma welding;
- e) submerged arc welding;
- f) plasma cutting/gouging.

5.3 Guidance

Methods of torch guidance:

- a) manual;
- b) mechanical.

5.4 Cooling

Type of torch cooling method:

- a) ambient air or shielding gas, see 3.12;
- b) liquid, see 3.13.

5.5 Main arc striking for plasma processes

Methods for striking the main arc:

- a) by an arc striking voltage;
- b) by a pilot arc;
- c) by contact.