

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Arc welding equipment –
Part 7: Torches**

**Matériel de soudage à l'arc –
Partie 7: Torches**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ARC WELDING EQUIPMENT –

Part 7: Torches

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International Standard IEC 60974-7 has been prepared by IEC technical committee 26: Electric welding.

This fourth edition cancels and replaces the third edition published in 2013 and constitutes a technical revision.

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

- a) definitions 3.11 and 3.20 were revised;
- b) requirements for ARC STRIKING AND STABILIZING VOLTAGE rating have been added to the sequence of type tests (see 6.2);
- c) the AC test voltage requirement for TORCHES that utilize ARC STRIKING AND STABILIZING VOLTAGES has been revised (see 7.5.2);

- d) the test configuration of isolated circuits for TORCHES that utilize ARC STRIKING AND STABILIZING VOLTAGES has been revised (see 7.5.2);
- e) the metal tube used for the heating tests has additional allowable means of cooling methods (see 8.3.2 and 8.3.5);
- f) for FUME EXTRACTION TORCHES, the instructions for use include additional information (see Clause 13, item i)).

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

FDIS	Report on voting
26/673/FDIS	26/678/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:

- conformity statements: *in italic type*;
- terms used throughout this standard which have been defined in clause 3: SMALL ROMAN CAPITALS.

This document is to be used in conjunction with IEC 60974-1:2017.

A list of all parts in the IEC 60974 series, published under the general title *Arc welding equipment*, can be found 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- withdrawn,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 7: Torches

1 Scope

This part of IEC 60974 specifies safety and construction requirements for TORCHES used for arc welding and allied processes. This document is applicable to MANUAL, MECHANICALLY GUIDED, AIR-COOLED, LIQUID-COOLED, MOTORIZED, SPOOL-ON and FUME EXTRACTION TORCHES.

In this document, a TORCH consists of the TORCH BODY, the CABLE-HOSE ASSEMBLY and other components.

This document is also applicable to a CABLE-HOSE ASSEMBLY connected between a power source and ancillary equipment.

This document is not applicable to electrode holders for manual metal arc welding or air-arc cutting/gouging.

NOTE 1 Typical allied processes are electric arc cutting and arc spraying.

NOTE 2 Other components are listed in Table A.1.

NOTE 3 In this document, all procedures and requirements are the same for "TORCHES" and "GUNS". For convenience, the term "TORCH" is used in the following text.

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

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60974-1:2017, *Arc welding equipment – Part 1: Welding power sources*

ISO 21904-3:2018, *Health and safety in welding and allied processes – Requirements, testing and marking of equipment for air filtration – Part 3: Determination of the capture efficiency of on-torch welding fume extraction devices*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60974-1, as well as the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

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, ELECTRODE WIRE)

[SOURCE: IEC 60050-851:2008, 851-14-21]

3.2

gun

TORCH with a HANDLE substantially perpendicular to the TORCH BODY

[SOURCE: IEC 60050-851:2008, 851-14-22]

3.3

torch body

main component to which the CABLE-HOSE ASSEMBLY and other components are connected

[SOURCE: IEC 60050-851:2008, 851-14-29]

3.4

handle

part designed to be held in the operator's hand

[SOURCE: IEC 60050-851:2008, 851-14-28, modified – The statement “of a TORCH or an electrode holder” after the term is deleted.]

3.5

gas nozzle

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

[SOURCE: IEC 60050-851:2008, 851-14-56]

3.6

wire electrode

solid or tubular FILLER WIRE which conducts welding current

[SOURCE: IEC 60050-851:2008, 851-14-02]

3.7

contact tip

replaceable metal component fixed at the front end of the TORCH, which transfers the welding current to, and guides, the WIRE ELECTRODE

[SOURCE: IEC 60050-851:2008, 851-14-17]

3.8

cable-hose assembly

flexible assembly of cables and hoses, and their connecting elements, that delivers supplies to the TORCH BODY or ancillary equipment

[SOURCE: IEC 60050-851:2008, 851-14-34, modified – The definition is expanded to include ancillary equipment and the word “supplies” is used instead of “all necessary services”.

3.9

manual torch

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

[SOURCE: IEC 60050-851:2008, 851-14-24]

3.10

mechanically guided torch

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

[SOURCE: IEC 60050-851:2008, 851-14-25]

3.11

air-cooled torch

TORCH cooled by the ambient air and, where appropriate, by gas flow

3.12

liquid-cooled torch

TORCH cooled by the circulation of a cooling liquid

3.13

motorized torch

TORCH incorporating means to supply motion to the WIRE ELECTRODE

[SOURCE: IEC 60050-851:2008, 851-14-26]

3.14

spool-on torch

MOTORIZED TORCH incorporating a FILLER WIRE supply

[SOURCE: IEC 60050-851:2008, 851-14-27]

3.15

arc striking and stabilizing voltage

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

3.16

filler metal

metal added during welding or allied processes

[SOURCE: IEC 60050-851:2008, 851-14-43]

3.17

filler wire

FILLER METAL, in solid or tubular wire form, which may or may not be part of the welding circuit

[SOURCE: IEC 60050-851:2008, 851-14-44]

3.18

plasma tip

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

[SOURCE: IEC 60050-851:2008, 851-14-18]

3.19**visual inspection**

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

[SOURCE: IEC 60050-851:2008, 851-11-11]

3.20**plasma cutting system**

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

[SOURCE: IEC 60050-851:2008, 851-13-03, modified – The word “safety” is deleted between the words “associated” and “devices”.]

3.21**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 1 to entry: A PLASMA CUTTING POWER SOURCE may also supply services to other equipment and auxiliaries, for example auxiliary power, cooling liquid, and gas.

[SOURCE: IEC 60050-851:2008, 851-13-04, modified – The word “electric” is deleted before the word “current”.]

3.22**torch coupling device**

part of TORCH connecting the CABLE-HOSE ASSEMBLY to the welding equipment

Note 1 to entry: A TORCH COUPLING DEVICE may include several connecting parts.

3.23**fume extraction torch**

TORCH that incorporates means to capture the welding fumes

4 Environmental conditions

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

- a) range of ambient air temperature:
 - during operation: –10 °C to +40 °C;
- b) relative humidity of the air:
 - up to 50 % at 40 °C;
 - up to 90 % at 20 °C.

TORCHES shall withstand storage and transport at an ambient air temperature of –20 °C to +55 °C without any damage to function and performance.

NOTE Different environmental conditions can 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 mould.