

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Arc welding equipment –  
Part 5: Wire feeders**

**Matériel de soudage à l'arc –  
Partie 5: Dévidoirs**

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INTERNATIONAL  
ELECTROTECHNICAL  
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## ARC WELDING EQUIPMENT –

### Part 5: Wire feeders

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International Standard IEC 60974-5 has been prepared by IEC technical committee 26: Electric welding.

This second edition cancels and replaces the first edition published in 2002 and constitutes a technical revision.

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

- changes induced by the publication of IEC 60974-1, edition 3;
- IEC 60974-5 is not applicable to spool-on torches that IEC 60974-7 covers (see Clause 1);
- IEC 60974-5 is not applicable to wire feeders which are designed for use by laymen that IEC 60974-6 covers (see Clause 1);
- wire feeders with degree of protection IP23S may be stored, but are not intended to be used outside during precipitation unless sheltered (see 6.2.1 and Table 1);
- withdrawal of voltage limitation for input supply network (see 6.4);
- protective connection provision for welding circuit (see 6.5);

- addition of tilting stability (see 10.5);
- clarification of the definition of the thermal requirement test. The manufacturer gives the maximum load (see Clause 9);
- introduction of rating plate layout for stand-alone wire feeder (see 11.2);
- introduction of new combined symbols for liquid/gas input and output based on IEC 60974-1 (see 13.2).

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

FDIS	Report on voting
26/364/FDIS	26/368/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 3.

This standard shall be used in conjunction with IEC 60974-1 and IEC 60974-7.

The list of all the parts of IEC 60974, under the general title *Arc welding equipment*, can be found on the IEC web site.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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

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## ARC WELDING EQUIPMENT –

### Part 5: Wire feeders

#### 1 Scope

This part of IEC 60974 specifies safety and performance requirements for industrial and professional equipment used in arc welding and allied processes to feed filler wire.

The wire feeder may be a stand-alone unit which may be connected to a separate welding power source or one where the welding power source and the wire feeder are housed in a single enclosure.

The wire feeder may be suitable for manually or mechanically guided torches.

This part of IEC 60974 is not applicable to spool-on torches that are covered by IEC 60974-7.

This part of IEC 60974 is not applicable to wire feeders which are designed for use by laymen and are covered by IEC 60974-6.

NOTE 1 Typical allied processes are, for example, plasma arc cutting and arc spraying.

NOTE 2 This standard does not include electromagnetic compatibility (EMC) requirements.

#### 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 60050-195, *International Electrotechnical Vocabulary (IEV) – Part 195: Earthing and protection against electric shock*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

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

IEC 60974-7, *Arc welding equipment – Part 7: Torches*

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

#### 3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 60050(195), IEC 60974-1, and IEC 60974-7, as well as the following, apply.

##### 3.1 crushing zone

place or area in which the human body or parts of the human body are exposed to a crushing hazard

NOTE This hazard will be generated, if two movable parts are moving towards each other or one movable part is moving towards a fixed part.



**3.2  
drive rolls**

rolls in contact with the filler wire and which transfer mechanical power to the filler wire

**3.3  
filler wire**

filler metal in the form of a coil of wire

**3.4  
filler wire supply**

source of filler wire and means for dispensing filler wire to the feeding mechanism

**3.5  
liner**

component of the cable hose assembly through which the filler wire is fed

**3.6  
maximum load**

value of the mechanical load that produces the rated supply current over the rated speed range

**3.7  
rated speed range**

speed range of the filler wire specified by the manufacturer for each rated size of filler wire

**3.8  
rated supply current**

$I_1$

r.m.s. value of an input current to the wire feeder at maximum load

**3.9  
wire electrode**

solid or tubular filler wire which conducts welding current

**3.10  
wire-feed control**

electrical or mechanical apparatus, or both, which control(s) the speed of the filler wire, the sequence of operations and other services as required

NOTE The wire feed control may be integral with the wire feeder or in a separate enclosure.

**3.11  
wire feeder**

equipment that delivers filler wire to the arc or weld zone which includes the wire-feed control and means to apply motion to the filler wire and may also include the filler wire supply

**4 Environmental conditions**

See Clause 4 of IEC 60974-1.

**5 Tests****5.1 Test conditions**

As specified in 5.1 of IEC 60974-1.

## 5.2 Measuring instruments

As specified in 5.2 of IEC 60974-1.

## 5.3 Conformity of components

As specified in 5.3 of IEC 60974-1.

## 5.4 Type tests

All type tests given below shall be carried out on the same wire feeder.

As a condition of conformity the type tests given below shall be carried out in the following sequence:

- a) visual inspection (see 3.7 of IEC 60974-1);
- b) insulation resistance (see 6.1.4 of IEC 60974-1 (preliminary check));
- c) enclosure (see 14.2 of IEC 60974-1);
- d) handling means (see 10.3);
- e) drop withstand (see 10.4);
- f) protection provided by the enclosure (see 6.2.1);
- g) insulation resistance (see 6.1.4 of IEC 60974-1);
- h) dielectric strength (see 6.1.5 of IEC 60974-1);
- i) visual inspection (see 3.7 of IEC 60974-1).

The other tests included in this standard and not listed here may be carried out in any convenient sequence.

## 5.5 Routine tests

All routine tests given below shall be carried out on each wire feeder in the following sequence:

- a) visual inspection (see 3.7 of IEC 60974-1);
- b) continuity of the protective circuit, if applicable (see 10.4.2 of IEC 60974-1);
- c) dielectric strength (see 6.1.5 of IEC 60974-1);
- d) visual inspection (see 3.7 of IEC 60974-1).

## 6 Protection against electric shock

### 6.1 Insulation

See 6.1 of IEC 60974-1.

### 6.2 Protection against electric shock in normal service (direct contact)

#### 6.2.1 Protection provided by the enclosure

The minimum degree of protection for wire feeders shall be in accordance with Table 1.

**Table 1 – Minimum degree of protection**

Component	Designed for indoor use	Designed for outdoor use
Motor and control supplied by a voltage $\leq$ SELV	IP2X	IP23S
Motor and control supplied by a voltage $>$ SELV	IP21S	IP23S
Live parts at welding potential for wire feeders used with manually guided torches (for example, filler wire, wire spool, drive rolls)	IPXX	IPX3
Live parts at welding potential for wire feeders used with mechanically guided torches (for example, filler wire, wire spool, drive rolls)	IPXX	IPXX
NOTE See also 10.8.		

Wire feeders with degree of protection IP23S may be stored but are not intended to be used outside during precipitation unless sheltered.

Adequate drainage shall be provided by the enclosure. Retained water shall not interfere with the correct operation of the equipment or impair safety.

*Conformity shall be checked* as specified in IEC 60529.

For this test, the filler wire shall be fed into the drive system and all external connectors shall be connected or covered.

The degree of water protection is met if, immediately after this test, the dielectric strength is verified as specified in 6.2.1 of IEC 60974-1.

When live parts at welding potential are protected against precipitation, the filler wire shall show no visual wetness after the test.

### 6.2.2 Capacitors

See 6.2.2 of IEC 60974-1.

### 6.2.3 Automatic discharge of input capacitors

See 6.2.3 of IEC 60974-1.

## 6.3 Protection against electric shock in case of a fault condition (indirect contact)

### 6.3.1 Isolation of the supply circuit and the welding circuit

See 6.3.2 of IEC 60974-1.

NOTE Only one reinforced or double insulation between the welding circuit and the mains is required.

### 6.3.2 Isolation of the welding circuit from the frame

Live parts at welding potential (for example, filler wire, wire spool, drive rolls) shall be isolated from the wire feeder frame or other structure to which they are attached by basic insulation (see Tables 1 and 2 of IEC 60974-1).

*Conformity shall be checked* as specified in 6.1 of IEC 60974-1.

### **6.3.3 Internal conductors and connections**

See 6.3.4 of IEC 60974-1.

### **6.4 Rated supply voltage**

The rated supply voltage shall be supplied from a welding power source as specified in 11.5 of IEC 60974-1 or from the input supply network provided that 6.5 is met.

### **6.5 Protective provisions**

Connection of exposed conductive parts to the protective conductor is not required if the rated supply voltage is supplied by the welding circuit or SELV.

Connection of exposed conductive parts to the protective conductor is required if the wire feeder is rated for supply voltages above SELV. The protective conductor connection shall be secured to the frame or enclosure by a screw or fastening that shall not require removal during any servicing operation. Solder alone shall not be used for securing the protective conductor terminals.

The welding circuit and conductive parts connected to the welding circuit shall not be connected to the protective conductor.

Where a protective conductor is used, it shall be protected against damage by stray welding currents, for example, by a device to sense welding current in the protective earth conductor under a fault condition and to de-energize the welding circuit or by insulation of the relevant metal parts, for example, by an enclosure.

*Conformity shall be checked* by visual inspection and performing the following fault simulations:

- a) applying a current not greater than the rated current value of the protective conductor;
- b) passing the maximum rated welding current through the protective conductor without damage.

### **6.6 Overcurrent protection of the supply circuit**

Internal wiring shall be protected by an overcurrent protective device such as a fuse or circuit-breaker.

If a wire feeder is designed for use with a specific welding power source, the overcurrent protective device may be within the welding power source.

*Conformity shall be checked* by visual inspection.

### **6.7 Cable anchorage**

The supply cable anchorage of wire feeders which are supplied by a voltage in excess of safety extra low voltage (SELV) shall meet 10.5 of IEC 60974-1, except for those powered from the welding circuit.

### **6.8 Auxiliary power output**

See 11.6 of IEC 60974-1.

### **6.9 Inlet opening**

See 10.6 of IEC 60974-1.