BS EN IEC 60974-7:2019

This is a preview of "BS EN IEC 60974-7:20...". Click here to purchase the full version from the ANSI store.



BSI Standards Publication

Arc welding equipment

Part 7: Torches



National foreword

This British Standard is the UK implementation of EN IEC 60974-7:2019. It is identical to IEC 60974-7:2019. It supersedes BS EN 60974-7:2013, which is withdrawn.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.

© The British Standards Institution 2019 Published by BSI Standards Limited 2019

ISBN 978 0 580 98165 4

ICS 25.160.30

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 November 2019.

Amendments/corrigenda issued since publication

Date

Text affected

ENIEC 6007/ 7

This is a preview of "BS EN IEC 60974-7:20...". Click here to purchase the full version from the ANSI store.

EUROPÄISCHE NORM

November 2019

ICS 25.160.30

Supersedes EN 60974-7:2013 and all of its amendments and corrigenda (if any).

English Version

Arc welding equipment - Part 7: Torches (IEC 60974-7:2019)

Matériel de soudage à l'arc - Partie 7: Torches (IEC 60974-7:2019) Lichtbogenschweißeinrichtungen - Teil 7: Brenner (IEC 60974-7:2019)

This European Standard was approved by CENELEC on 2019-03-06. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 26/673/FDIS, future edition 4 of IEC 60974-7, prepared by IEC/TC 26 "Electric welding" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60974-7:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2020-05-08 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2022-11-08 document have to be withdrawn

This document supersedes EN 60974-7:2013 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60974-7:2019 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60974-2 NOTE Harmonized as EN 60974-2

(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: <u>www.cenelec.eu</u>.

Publication	<u>Year</u>	Title	<u>EN/HD</u>	Year
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	-	-
IEC 60695-11-10-		Fire hazard testing - Part 11-10: Test flames - 50 EN 60695-11-10- W horizontal and vertical flame test methods		0-
IEC 60974-1	2017	Arc welding equipment - Part 1: Welding power sources	EN IEC 60974-	1 2018
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	EN ISO 21904-	32018

(informative)

Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered

This European Standard has been prepared under a Commission's standardization request relating to harmonized standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding safety objectives of that Directive, and associated EFTA regulations.

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
1(a)	Clauses 12, 13	
1(b)	Clause 13	
1(c)		Testing during periodic maintenance or after repair is covered in separate standards
2(a)	Clauses 7, 13 k) and p)	
2(b)	Clauses 7, 8	Hazards arising from electric, magnetic, and electromagnetic fields, other ionizing and non-ionizing radiation are covered in separate standards
2(c)	Clauses 6.3 b), 9, 10, 11.3, 13 i) 2) and n)	Acoustic noise is covered in separate standards
2(d)	Clause 7.2, 7.3, 10	
3(a)	Clause 9, 10, 11	
3(b)	Clauses 4, 11.3, 13 l) and n),	Functional safety is covered in separate standards Safety-related security is covered in separate standards
3(c)	not applicable	For this product type, there are no overload conditions.

Table ZZ.1 – Correspondence between this European standard and Annex I of Directive
2014/35/EU [2014 OJ L96]

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

CONTENTS

FORE\	NORD	4	
1 So	cope	6	
2 No	ormative references	6	
3 Te	erms and definitions	6	
4 Er	nvironmental conditions	9	
	assification		
5.1	General		
5.2	Process		
5.3	Guidance		
5.4	Cooling	10	
5.5	Main arc striking for plasma processes	10	
6 Te	est conditions	10	
6.1	General	10	
6.2	Type tests	11	
6.3	Routine tests	11	
7 Pr	otection against electric shock	11	
7.1	Voltage rating	11	
7.2	Insulation resistance	12	
7.3	Dielectric strength		
	3.1 General requirement		
	3.2 Additional requirements for plasma cutting TORCHES		
7.4	5		
	4.1 Degree of protection requirements		
7. 7.5	4.2 Additional requirements for plasma cutting TORCHES Requirements for ARC STRIKING AND STABILIZING VOLTAGE rating		
	5.1 General requirement		
	5.2 ARC STRIKING AND STABILIZING VOLTAGE test		
	nermal rating		
8.1	General		
8.2	Temperature rise		
8.3	Heating test		
	3.1 General		
8.	3.2 Metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding TORCH	16	
8.	3.3 Tungsten inert gas (TIG) and plasma arc welding TORCH	18	
8.	3.4 Plasma cutting TORCH	19	
8.	3.5 Submerged arc welding TORCH	19	
9 Pr	essure of the liquid cooling system	20	
10 Re	esistance to hot objects	20	
11 M	echanical provisions	21	
11.1	Impact resistance	21	
11.2	2 Accessible parts	22	
11.3	B HANDLE material	22	
12 M	12 Marking		
13 In	structions for use	22	

Annex D (informative) Copper block with a hole	ex C (informative) Cooled copper block 2 ex D (informative) Copper block with a hole 2 ex E (informative) Copper bars with a slot 3 ography 3 re 1 - Device for testing the resistance to hot objects 2 re 2 - Device for the impact test 2 re A.1 - TORCH for metal inert/active gas (MIG/MAG) or self-shielded flux-cored welding 2 re A.2 - GUN for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc 2 ing 2 re A.3 - TORCH for tungsten inert gas arc welding 2 re A.3 - TORCH for plasma arc welding 2 re A.4 - TORCH for plasma arc welding 2 re A.5 - TORCH for plasma arc welding 2 re A.6 - Supply unit 2 re B.1 - MIG/MAG TORCHES 2 re B.2 - TIG TORCHES 2 re B.3 - Plasma welding TORCHES 2 re C.1 - Water-cooled copper block – Example 2 re E.1 - Water-cooled copper block with a hole – Example 3 e 1 - Voltage rating of TORCHES 1 e 2 - Test values for metal active gas arc welding (MIG) of aluminium alloys 1 e 3 - Test values for metal active gas arc welding (MAG) of mild steel </th
Annex C (informative) Cooled copper block	ex D (informative) Copper block with a hole 2 ex E (informative) Copper bars with a slot 3 ography 3 re 1 - Device for testing the resistance to hot objects 2 re 2 - Device for the impact test 2 re A.1 - TORCH for metal inert/active gas (MIG/MAG) or self-shielded flux-cored welding 2 re A.2 - GUN for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc 2 ing 2 re A.3 - TORCH for tungsten inert gas arc welding 2 re A.5 - TORCH for plasma arc welding 2 re A.5 - TORCH for plasma arc welding 2 re A.5 - TORCH for plasma actuting 2 re A.6 - Supply unit 2 re B.1 - MIG/MAG TORCHES 2 re B.2 - TIG TORCHES 2 re B.3 - Plasma welding TORCHES 2 re C.1 - Water-cooled copper block – Example 2 re E.1 - Water-cooled copper block with a hole – Example 2 re E.1 - Water-cooled copper block with a slot – Example 3 e 1 - Voltage rating of TORCHES 1 e 2 - Test values for metal active gas arc welding (MIG) of aluminium alloys 1 e 3 - Test values for metal active gas arc welding (MAG)
Annex E (informative) Copper bars with a slot	ex E (informative) Copper bars with a slot
Bibliography. Figure 1 – Device for testing the resistance to hot objects Figure 2 – Device for the impact test. Figure A.1 – TORCH for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding. Figure A.2 – GUN for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding. Figure A.3 – TORCH for tungsten inert gas arc welding. Figure A.4 – TORCH for plasma arc welding. Figure A.5 – TORCH for plasma cutting Figure A.6 – Supply unit. Figure B.7 – MECHANICALLY GUIDED plasma TORCH Figure B.2 – TIG TORCHES Figure B.3 – Plasma welding TORCHES Figure C.1 – Water-cooled copper block – Example Figure E.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a slot – Example Figure E.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a lost – Example Figure E.1 – Water-cooled copper block with a lost – Example Figure E.1 – Water-cooled copper block with a lost – Example Figure E.1 – Water-cooled copper block with a lost – Example Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) with flux-cored wire	ography 3 re 1 – Device for testing the resistance to hot objects 2 re 2 – Device for the impact test 2 re A.1 – TORCH for metal inert/active gas (MIG/MAG) or self-shielded flux-cored welding 2 re A.2 – GUN for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc 2 ing 2 re A.3 – TORCH for tungsten inert gas arc welding 2 re A.4 – TORCH for plasma arc welding 2 re A.5 – TORCH for plasma arc welding 2 re A.6 – Supply unit 2 re A.7 – MECHANICALLY GUIDED plasma TORCH 2 re B.1 – MIG/MAG TORCHES 2 re B.3 – Plasma welding TORCHES 2 re B.3 – Plasma welding TORCHES 2 re C.1 – Water-cooled copper block – Example 2 re E.1 – Water-cooled copper block with a hole – Example 3 re I – Voltage rating of TORCHES 1 e 1 – Voltage rating of TORCHES 1 e 2 – Test values for metal active gas arc welding (MIG) of aluminium alloys 1 e 3 – Test values for metal active gas arc welding (MAG) of mild steel 1 e 4 – Test values for metal active gas arc welding (MAG) of mild steel 1 e 5 – Te
Figure 1 – Device for testing the resistance to hot objects Figure 2 – Device for the impact test. Figure A.1 – TORCH for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding Figure A.2 – GUN for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding Figure A.3 – TORCH for tungsten inert gas arc welding Figure A.4 – TORCH for plasma arc welding Figure A.5 – TORCH for plasma cutting Figure A.6 – Supply unit Figure B.1 – MIG/MAG TORCHES Figure B.2 – TIG TORCHES Figure B.3 – Plasma welding TORCHES Figure D.1 – Water-cooled copper block – Example Figure D.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a slot – Example Figure B.1 – Voltage rating of TORCHES Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) of mild steel Table 4 – Test values for self-shielded flux-cored arc welding of mild steel Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Table 6 – Test values for tungsten inert gas arc welding (MAG) with flux-cored wire	re 1 – Device for testing the resistance to hot objects
Figure 2 – Device for the impact test. Figure A.1 – TORCH for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding. Figure A.2 – GUN for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding. Figure A.3 – TORCH for tungsten inert gas arc welding. Figure A.4 – TORCH for plasma arc welding. Figure A.5 – TORCH for plasma arc welding. Figure A.6 – Supply unit. Figure B.1 – MIG/MAG TORCHES Figure B.2 – TIG TORCHES. Figure B.3 – Plasma welding TORCHES Figure D.1 – Water-cooled copper block – Example. Figure E.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a hole – Example Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) of mild steel. Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for tungsten inert gas arc welding (MAG) with flux-cored wire Table 5 – Test values for tungsten inert gas arc welding (TIG)	re 2 – Device for the impact test
Figure A.1 – TORCH for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding Figure A.2 – GUN for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding Figure A.3 – TORCH for tungsten inert gas arc welding Figure A.4 – TORCH for plasma arc welding Figure A.5 – TORCH for plasma cutting Figure A.6 – Supply unit Figure B.1 – MIG/MAG TORCHES Figure B.2 – TIG TORCHES Figure B.3 – Plasma welding TORCHES Figure D.1 – Water-cooled copper block – Example Figure E.1 – Water-cooled copper block with a hole – Example Figure E.1 – Voltage rating of TORCHES Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for tungsten inert gas arc welding (TIG)	re A.1 – TORCH for metal inert/active gas (MIG/MAG) or self-shielded flux-cored welding
arc welding Figure A.2 – GUN for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding Figure A.3 – TORCH for tungsten inert gas arc welding Figure A.4 – TORCH for plasma arc welding Figure A.5 – TORCH for plasma cutting Figure A.6 – Supply unit. Figure A.7 – MECHANICALLY GUIDED plasma TORCH Figure B.1 – MIG/MAG TORCHES Figure B.2 – TIG TORCHES Figure C.1 – Water-cooled copper block – Example Figure D.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a slot – Example Figure E.1 – Water-cooled copper block with a slot – Example Figure B.3 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 2 – Test values for metal active gas arc welding (MAG) of mild steel Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Table 6 – Test values for tungsten inert gas arc welding (TIG)	welding 2 re A.2 – GUN for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc 2 ing 2 re A.3 – TORCH for tungsten inert gas arc welding 2 re A.4 – TORCH for plasma arc welding 2 re A.5 – TORCH for plasma arc welding 2 re A.6 – Supply unit 2 re A.7 – MECHANICALLY GUIDED plasma TORCH 2 re B.1 – MIG/MAG TORCHES 2 re B.3 – Plasma welding TORCHES 2 re C.1 – Water-cooled copper block – Example 2 re E.1 – Water-cooled copper block with a hole – Example 2 re E.1 – Water-cooled copper block with a slot – Example 3 e 1 – Voltage rating of TORCHES 1 e 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys 1 e 3 – Test values for metal active gas arc welding (MAG) of mild steel 1 e 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire 1 e 5 – Test values for tungsten inert gas arc welding (MAG) with flux-cored wire 1 e 6 – Test values for tungsten inert gas arc welding (TIG) 1 e 7 – Test values for plasma arc welding 1
 welding Figure A.3 – TORCH for tungsten inert gas arc welding Figure A.4 – TORCH for plasma arc welding Figure A.5 – TORCH for plasma cutting Figure A.6 – Supply unit Figure A.7 – MECHANICALLY GUIDED plasma TORCH Figure B.1 – MIG/MAG TORCHES Figure B.2 – TIG TORCHES Figure B.3 – Plasma welding TORCHES Figure D.1 – Water-cooled copper block – Example Figure E.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a slot – Example Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of TIG). 	ling 2 re A.3 – TORCH for tungsten inert gas arc welding 2 re A.4 – TORCH for plasma arc welding 2 re A.5 – TORCH for plasma arc welding 2 re A.6 – Supply unit 2 re A.7 – MECHANICALLY GUIDED plasma TORCH 2 re B.1 – MIG/MAG TORCHES 2 re B.2 – TIG TORCHES 2 re B.3 – Plasma welding TORCHES 2 re C.1 – Water-cooled copper block – Example 2 re D.1 – Water-cooled copper block with a hole – Example 2 re E.1 – Water-cooled copper block with a slot – Example 3 e 1 – Voltage rating of TORCHES 1 e 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys 1 e 3 – Test values for metal active gas arc welding (MAG) of mild steel 1 e 4 – Test values for self-shielded flux-cored arc welding of mild steel 1 e 5 – Test values for self-shielded flux-cored arc welding of mild steel 1 e 6 – Test values for tungsten inert gas arc welding (TIG) 1 e 7 – Test values for plasma arc welding 1
Figure A.4 – TORCH for plasma arc welding. Figure A.5 – TORCH for plasma cutting	re A.4 – TORCH for plasma arc welding 2 re A.5 – TORCH for plasma cutting 2 re A.6 – Supply unit 2 re A.7 – MECHANICALLY GUIDED plasma TORCH 2 re B.1 – MIG/MAG TORCHES 2 re B.2 – TIG TORCHES 2 re B.3 – Plasma welding TORCHES 2 re C.1 – Water-cooled copper block – Example 2 re E.1 – Water-cooled copper block with a hole – Example 2 re E.1 – Water-cooled copper block with a slot – Example 3 e 1 – Voltage rating of TORCHES 1 e 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys 1 e 3 – Test values for metal active gas arc welding (MAG) of mild steel 1 e 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire 1 e 5 – Test values for self-shielded flux-cored arc welding of mild steel 1 e 6 – Test values for tungsten inert gas arc welding (TIG) 1 e 7 – Test values for plasma arc welding 1
Figure A.5 – TORCH for plasma cutting Figure A.6 – Supply unit. Figure A.7 – MECHANICALLY GUIDED plasma TORCH Figure B.1 – MIG/MAG TORCHES Figure B.2 – TIG TORCHES Figure B.3 – Plasma welding TORCHES Figure C.1 – Water-cooled copper block – Example Figure D.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a slot – Example Figure E.1 – Water-cooled copper block with a slot – Example Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) of mild steel Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Table 6 – Test values for tungsten inert gas arc welding (TIG)	re A.5 – TORCH for plasma cutting 2 re A.6 – Supply unit. 2 re A.7 – MECHANICALLY GUIDED plasma TORCH 2 re B.1 – MIG/MAG TORCHES 2 re B.2 – TIG TORCHES 2 re B.3 – Plasma welding TORCHES 2 re C.1 – Water-cooled copper block – Example 2 re D.1 – Water-cooled copper block with a hole – Example 2 re E.1 – Water-cooled copper block with a slot – Example 3 e 1 – Voltage rating of TORCHES 1 e 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys 1 e 3 – Test values for metal active gas arc welding (MAG) of mild steel 1 e 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire 1 e 5 – Test values for self-shielded flux-cored arc welding of mild steel 1 e 6 – Test values for tungsten inert gas arc welding (TIG) 1 e 7 – Test values for plasma arc welding 1
Figure A.6 – Supply unit. Figure A.7 – MECHANICALLY GUIDED plasma TORCH Figure B.1 – MIG/MAG TORCHES Figure B.2 – TIG TORCHES Figure B.3 – Plasma welding TORCHES Figure C.1 – Water-cooled copper block – Example Figure D.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a slot – Example Figure E.1 – Water-cooled copper block with a slot – Example Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) of mild steel Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Table 5 – Test values for tungsten inert gas arc welding (TIG)	re A.6 – Supply unit. 2 re A.7 – MECHANICALLY GUIDED plasma TORCH 2 re B.1 – MIG/MAG TORCHES 2 re B.2 – TIG TORCHES 2 re B.3 – Plasma welding TORCHES 2 re C.1 – Water-cooled copper block – Example 2 re E.1 – Water-cooled copper block with a hole – Example 2 re E.1 – Water-cooled copper block with a slot – Example 3 e 1 – Voltage rating of TORCHES 1 e 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys 1 e 3 – Test values for metal active gas arc welding (MAG) of mild steel 1 e 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire 1 e 5 – Test values for self-shielded flux-cored arc welding of mild steel 1 e 6 – Test values for tungsten inert gas arc welding (TIG) 1 e 7 – Test values for plasma arc welding 1
Figure A.7 – MECHANICALLY GUIDED plasma TORCH	re A.7 – MECHANICALLY GUIDED plasma TORCH 2 re B.1 – MIG/MAG TORCHES 2 re B.2 – TIG TORCHES 2 re B.3 – Plasma welding TORCHES 2 re C.1 – Water-cooled copper block – Example 2 re D.1 – Water-cooled copper block with a hole – Example 2 re E.1 – Water-cooled copper block with a slot – Example 3 e 1 – Voltage rating of TORCHES 1 e 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys 1 e 3 – Test values for metal active gas arc welding (MAG) of mild steel 1 e 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire 1 e 5 – Test values for self-shielded flux-cored arc welding of mild steel 1 e 6 – Test values for tungsten inert gas arc welding (TIG) 1 e 7 – Test values for plasma arc welding 1
Figure B.1 – MIG/MAG TORCHES Figure B.2 – TIG TORCHES Figure B.3 – Plasma welding TORCHES Figure C.1 – Water-cooled copper block – Example Figure D.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a slot – Example Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) of mild steel Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Table 6 – Test values for tungsten inert gas arc welding (TIG)	re B.1 – MIG/MAG TORCHES 2 re B.2 – TIG TORCHES 2 re B.3 – Plasma welding TORCHES 2 re C.1 – Water-cooled copper block – Example 2 re D.1 – Water-cooled copper block with a hole – Example 2 re E.1 – Water-cooled copper block with a slot – Example 2 re E.1 – Water-cooled copper bars with a slot – Example 3 e 1 – Voltage rating of TORCHES 1 e 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys 1 e 3 – Test values for metal active gas arc welding (MAG) of mild steel 1 e 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire 1 e 5 – Test values for self-shielded flux-cored arc welding of mild steel 1 e 6 – Test values for tungsten inert gas arc welding (TIG) 1 e 7 – Test values for plasma arc welding 1
Figure B.2 – TIG TORCHES. Figure B.3 – Plasma welding TORCHES Figure C.1 – Water-cooled copper block – Example Figure D.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper block with a slot – Example Figure E.1 – Water-cooled copper bars with a slot – Example Table 1 – Voltage rating of TORCHES Figure E.1 – Water-cooled copper bars with a slot – Example Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Figure E.1 – Test values for metal active gas arc welding (MAG) of mild steel Table 3 – Test values for metal active gas arc welding (MAG) of mild steel Figure E.1 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Figure E.1 – Test values for tungsten inert gas arc welding (TIG)	re B.2 – TIG TORCHES
Figure B.3 – Plasma welding TORCHES Figure C.1 – Water-cooled copper block – Example Figure D.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper bars with a slot – Example Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) of mild steel Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Table 6 – Test values for tungsten inert gas arc welding (TIG)	re B.3 – Plasma welding TORCHES 2 re C.1 – Water-cooled copper block – Example 2 re D.1 – Water-cooled copper block with a hole – Example 2 re E.1 – Water-cooled copper bars with a slot – Example 3 e 1 – Voltage rating of TORCHES 1 e 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys 1 e 3 – Test values for metal active gas arc welding (MAG) of mild steel 1 e 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire 1 e 5 – Test values for self-shielded flux-cored arc welding of mild steel 1 e 6 – Test values for tungsten inert gas arc welding (TIG) 1 e 7 – Test values for plasma arc welding 1
Figure C.1 – Water-cooled copper block – Example Figure D.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper bars with a slot – Example Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) of mild steel Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Table 6 – Test values for tungsten inert gas arc welding (TIG)	re C.1 – Water-cooled copper block – Example
Figure D.1 – Water-cooled copper block with a hole – Example Figure E.1 – Water-cooled copper bars with a slot – Example Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) of mild steel Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Table 6 – Test values for tungsten inert gas arc welding (TIG)	re D.1 – Water-cooled copper block with a hole – Example
Figure E.1 – Water-cooled copper bars with a slot – Example Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) of mild steel Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Table 6 – Test values for tungsten inert gas arc welding (TIG)	re E.1 – Water-cooled copper bars with a slot – Example
Table 1 – Voltage rating of TORCHES Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys Table 3 – Test values for metal active gas arc welding (MAG) of mild steel Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire Table 5 – Test values for self-shielded flux-cored arc welding of mild steel Table 6 – Test values for tungsten inert gas arc welding (TIG)	e 1 – Voltage rating of TORCHES
Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloysTable 3 – Test values for metal active gas arc welding (MAG) of mild steelTable 4 – Test values for metal active gas arc welding (MAG) with flux-cored wireTable 5 – Test values for self-shielded flux-cored arc welding of mild steelTable 6 – Test values for tungsten inert gas arc welding (TIG)	e 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys
Table 3 – Test values for metal active gas arc welding (MAG) of mild steel.Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wireTable 5 – Test values for self-shielded flux-cored arc welding of mild steel.Table 6 – Test values for tungsten inert gas arc welding (TIG).	e 3 – Test values for metal active gas arc welding (MAG) of mild steel
Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wireTable 5 – Test values for self-shielded flux-cored arc welding of mild steelTable 6 – Test values for tungsten inert gas arc welding (TIG)	e 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire e 5 – Test values for self-shielded flux-cored arc welding of mild steel
Table 5 – Test values for self-shielded flux-cored arc welding of mild steelTable 6 – Test values for tungsten inert gas arc welding (TIG)	e 5 – Test values for self-shielded flux-cored arc welding of mild steel
Table 6 – Test values for tungsten inert gas arc welding (TIG)	e 6 – Test values for tungsten inert gas arc welding (TIG)1 e 7 – Test values for plasma arc welding1
	e 7 – Test values for plasma arc welding1
Table 7 – Test values for plasma arc welding	
······································	e A.1 – List of terms2

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ARC WELDING EQUIPMENT –

Part 7: Torches

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.
- The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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: