

© Copyright SEK Svensk Elstandard. Reproduction in any form without permission is prohibited.

Bågsvetsutrustning – Del 2: Utrustning för vätskekyllning

*Arc welding equipment –
Part 2: Liquid cooling systems*

Som svensk standard gäller europastandarden EN IEC 60974-2:2019. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 60974-2:2019.

Nationellt förord

Europastandarden EN IEC 60974-2:2019

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60974-2, Fourth edition, 2019 - Arc welding equipment - Part 2: Liquid cooling systems**

utarbetad inom International Electrotechnical Commission, IEC.

Standarden ska användas tillsammans med SS-EN IEC 60974-1, utgåva 5, 2018.

Tidigare fastställd svensk standard SS-EN 60974-2, utgåva 3, 2013, gäller ej fr o m 2022-03-06.

ICS 25.160.30

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN IEC 60974-2

April 2019

ICS 25.160.30

Supersedes EN 60974-2:2013

English Version

**Arc welding equipment - Part 2: Liquid cooling systems
(IEC 60974-2:2019)**

Matériel de soudage à l'arc - Partie 2: Systèmes de refroidissement par liquide
(IEC 60974-2:2019)

Lichtbogenschweißeinrichtungen - Teil 2:
Flüssigkeitskühlsysteme
(IEC 60974-2:2019)

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

© 2019 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Ref. No. EN IEC 60974-2:2019 E

European foreword

The text of document 26/670/FDIS, future edition 4 of IEC 60974-2, prepared by IEC/TC 26 "Electric welding" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60974-2:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-12-06
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-03-06

This document supersedes EN 60974-2:2013.

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 60974-2:2019 was approved by CENELEC as a European Standard without any modification.

Annex ZA
 (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: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60974-1	2017	Arc welding equipment - Part 1: Welding power sources	EN IEC 60974-1	2018
IEC 60974-7	2013	Arc welding equipment - Part 7: Torches	EN 60974-7	2013
IEC 60974-10	2014	Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements	EN 60974-10	2014

CONTENTS

FOREWORD	4
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Environmental conditions	7
5 Tests	7
5.1 Test conditions	7
5.2 Measuring instruments	7
5.3 Conformity of components	7
5.4 Type tests	7
5.5 Routine tests	7
6 Protection against electric shock	8
6.1 Insulation	8
6.1.1 General	8
6.1.2 Clearances	8
6.1.3 Creepage distances	8
6.1.4 Insulation resistance	8
6.1.5 Dielectric strength	8
6.2 Protection against electric shock in normal service (direct contact)	8
6.3 Protection against electric shock in case of a fault condition (indirect contact)	8
6.3.1 Protective provisions	8
6.3.2 Isolation between windings of the supply circuit and the welding circuit	8
6.3.3 Internal conductors and connections	8
6.3.4 Touch current in fault condition	8
6.4 Connection to the supply network	8
6.4.1 Supply voltage	8
6.4.2 Multi-supply voltage	9
6.4.3 Means of connection to the supply circuit	9
6.4.4 Marking of terminals	9
6.4.5 Protective circuit	9
6.4.6 Cable anchorage	9
6.4.7 Inlet openings	9
6.4.8 Supply circuit on/off switching device	9
6.4.9 Supply cables	9
6.4.10 Supply coupling device (attachment plug)	9
6.5 Leakage current between welding circuit and protective earth	9
7 Mechanical provisions	10
7.1 General	10
7.2 Cooling liquid overflow	10
7.3 Hose coupling devices and hose connections	10
8 Cooling system	10
8.1 Rated maximum pressure	10
8.2 Thermal requirements	11
8.2.1 Heating test	11
8.2.2 Tolerances of test parameters	11

8.2.3	Duration of test	11
8.3	Pressure and temperature.....	11
9	Abnormal operation	11
9.1	General requirements	11
9.2	Stalled test.....	12
10	COOLING POWER	12
11	Rating plate	13
11.1	General.....	13
11.2	Description	13
11.3	Contents	14
11.4	Tolerances.....	15
12	Instructions and markings	15
12.1	Instructions	15
12.2	Markings	16
12.2.1	General	16
12.2.2	Inlet and outlet.....	16
12.2.3	Pressure warning.....	16
Annex A (informative)	Example diagram of built-in and stand-alone LIQUID COOLING SYSTEMS.....	17
Annex B (informative)	Example for a rating plate of stand-alone cooling system	18
Figure 1 – Leakage current measurement configuration	10	
Figure 2 – Measuring circuit for determination of the COOLING POWER.....	13	
Figure 3 – Principle of the rating plate of stand-alone cooling systems.....	14	
Figure A.1 – Example diagram of built-in LIQUID COOLING SYSTEMS.....	17	
Figure A.2 – Example diagram of stand-alone LIQUID COOLING SYSTEMS	17	
Figure B.1 – Single-phase stand-alone cooling unit.....	18	
Table 1 – Example of cooling liquid data at 60 °C	13	

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ARC WELDING EQUIPMENT –

Part 2: Liquid cooling systems

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.
- 2) 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.
- 9) 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 60974-2 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) changes induced by the publication of IEC 60974-1:2017;
- b) reference in 11.1 changed.

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

FDIS	Report on voting
26/670/FDIS	26/675/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 shall be used in conjunction with IEC 60974-1:2017.

A list of all 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 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 2: Liquid cooling systems

1 Scope

This part of IEC 60974 specifies safety and construction requirements for industrial and professional LIQUID COOLING SYSTEMS used in arc welding and allied processes to cool torches.

This document is applicable to LIQUID COOLING SYSTEMS which are stand-alone (separate from the welding equipment) or built-in (housed in a single enclosure with other welding equipment).

This document is not applicable to refrigerated cooling systems.

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

NOTE 2 This part of IEC 60974 does not include electromagnetic compatibility (EMC) requirements that are given in IEC 60974-10.

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

IEC 60974-7:2013, *Arc welding equipment – Part 7: Torches*

IEC 60974-10:2014, *Arc welding equipment – Part 10: Electromagnetic compatibility (EMC) requirements*