

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

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

<https://standards.iteh.ai/catalog/standards/sist/6098888-6ccd-4828-b510-8891c4433883/iec-60974-7-2013>

<https://standards.iteh.ai/catalog/standards/sist/6098888-6ccd-4828-b510-8891c4433883/iec-60974-7-2013>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2013 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente. un corrigendum ou amendement peut avoir été publié.

Liens utiles:

Recherche de publications CEI - www.iec.ch/searchpub

La recherche avancée vous permet de trouver des publications CEI en utilisant différents critères (numéro de référence, texte, comité d'études,...).

Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

Just Published CEI - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications de la CEI. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (VEI) en ligne.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

U

ICS 25.160

ISBN 978-2-83220-573-0

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Environmental conditions.....	9
5 Classification.....	9
5.1 General.....	9
5.2 Process.....	9
5.3 Guidance.....	9
5.4 Cooling.....	9
5.5 Main arc striking for plasma processes.....	10
6 Test conditions	10
6.1 General.....	10
6.2 Type tests	10
6.3 Routine tests	10
7 Protection against electric shock	10
7.1 Voltage rating.....	10
7.2 Insulation resistance	11
7.3 Dielectric strength	12
7.3.1 General requirement.....	12
7.3.2 Additional requirements for plasma cutting torches.....	12
7.3.3 Additional requirements for striking and stabilizing voltage rating	12
7.4 Protection against electric shock in normal service (direct contact)	13
7.4.1 Degree of protection requirements.....	13
7.4.2 Additional requirements for plasma cutting torches.....	13
8 Thermal rating.....	13
8.1 General.....	13
8.2 Temperature rise.....	13
8.3 Heating test.....	14
8.3.1 General.....	14
8.3.2 Metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding torch.....	14
8.3.3 Tungsten inert gas (TIG) and plasma arc welding torch	16
8.3.4 Plasma cutting torch.....	17
8.3.5 Submerged arc welding torch	18
9 Pressure of the liquid cooling system.....	18
10 Resistance to hot objects	18
11 Mechanical provisions	19
11.1 Impact resistance	19
11.2 Accessible parts	20
11.3 Handle material	20
12 Marking	20
13 Instructions for use.....	21
Annex A (informative) Additional terminology.....	22
Annex B (normative) Position of the welding torches for the heating test.....	25

Annex C (informative) Cooled copper block	26
Annex D (informative) Copper block with a hole	27
Annex E (informative) Copper bars with a slot.....	28
Bibliography.....	29
Figure 1 – Device for testing the resistance to hot objects	19
Figure 2 – Device for the impact test.....	20
Figure A.1 – Torch for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding	23
Figure A.2 – Gun for metal inert/active gas (MIG/MAG) or self-shielded flux-cored arc welding	23
Figure A.3 – Torch for tungsten inert gas arc welding	23
Figure A.4 – Torch for plasma arc welding	23
Figure A.5 – Torch for plasma cutting	23
Figure A.6 – Supply unit.....	23
Figure A.7 – Mechanically guided plasma torch	24
Figure B.1 – MIG/MAG torches	25
Figure B.2 – TIG torches.....	25
Figure B.3 – Plasma welding torches	25
Figure C.1 – Water-cooled copper block – Example.....	26
Figure D.1 – Water-cooled copper block with a hole – Example	27
Figure E.1 – Water-cooled copper bars with a slot – Example.....	28
Table 1 – Voltage rating of torches	11
Table 2 – Test values for metal inert gas arc welding (MIG) of aluminium alloys	15
Table 3 – Test values for metal active gas arc welding (MAG) of mild steel.....	15
Table 4 – Test values for metal active gas arc welding (MAG) with flux-cored wire	16
Table 5 – Test values for self-shielded flux-cored arc welding of mild steel.....	16
Table 6 – Test values for tungsten inert gas arc welding (TIG).....	17
Table 7 – Test values for plasma arc welding.....	17
Table A.1 – List of terms.....	22

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

This third edition cancels and replaces the second edition published in 2005 and constitutes a technical revision. The significant changes with respect to the previous edition are listed below:

- new requirement for degree of protection of torch coupling device (see Table 1);
- scope is extended to cable-hose assembly connected between a power source and ancillary equipment (see Clause 1);
- torch parts, as recommended by the manufacturer, are included in the safe plasma cutting system design (see 7.4.2);
- new flammability requirement for handle material (see 11.3).

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

FDIS	Report on voting
26/492/FDIS	26/495/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 2.

This part of IEC 60974 is to be used in conjunction with IEC 60974-1.

A list of all parts of the IEC 60974 series can be found, under the general title *Arc welding equipment*, on the IEC website.

In this standard, the following print types are used:

– *conformity statements: in italic type.*

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

<https://standards.iteh.ai/catalog/standards/sis/6098888-6ccd-4828-b510-8891c4433883/iec-60974-7-2013>

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. This part of IEC 60974 is applicable to manual, mechanically guided, air-cooled, liquid-cooled, motorized, spool-on and fume extraction torches.

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 also applicable to a cable-hose assembly connected between a power source and ancillary equipment.

This part of IEC 60974 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 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050 (all parts), *International Electrotechnical Vocabulary* (available at <http://www.electropedia.org>)

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

IEC 60974-1:2012, *Arc welding equipment – Part 1: Welding power sources*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050, 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 supplies to the torch body or ancillary equipment

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

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

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

[SOURCE: IEC 60974-1:2012, 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 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 60974-1:2012, 3.55]

3.23

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.

3.24

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 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.

6 Test conditions

6.1 General

All tests shall be carried out on the same new and completely assembled torch, fitted with the cable-hose assembly normally supplied.

All tests shall be carried out at any ambient air temperature given in Clause 4, item a).

The accuracy of measuring instruments shall be:

- a) electrical measuring instruments: class 1 ($\pm 1\%$ of full-scale reading), except for the measurement of insulation resistance and dielectric strength where the accuracy of the instruments is not specified, but shall be taken into account for the measurement;
- b) temperature measuring device: ± 2 K.

6.2 Type tests

All type tests given below shall be carried out on the same sample and in the following sequence:

- a) general visual inspection;
- b) insulation resistance without humidity treatment (preliminary check), see 7.2;
- c) impact resistance, see 11.1;
- d) resistance to hot objects, see Clause 10;
- e) protection against direct contact, see 7.4;
- f) insulation resistance, see 7.2;
- g) dielectric strength, see 7.3;
- h) general visual inspection.

The heating test in accordance with 8.3 may be carried out on a separate sample and shall be followed by the coolant leakage test in accordance with Clause 9. The other tests included in this standard and not listed here may be carried out in any convenient sequence.

6.3 Routine tests

The following routine tests shall be carried out on each torch in the following sequence:

- a) general visual inspection;
- b) functional test as specified by the manufacturer, for example, leaks of fluid or gas, trigger operation.

7 Protection against electric shock

7.1 Voltage rating

Torches shall be rated according to the classification and use as given in Table 1.

Table 1 – Voltage rating of torches

Classification	Voltage rating V_{peak}	Insulation resistance M Ω	Dielectric strength V r.m.s.	Degree of protection in accordance with IEC 60529			
				Nozzle orifice	Handle	Torch coupling device ^a	Other parts ^{b, c}
Manually guided torches except for plasma cutting	113	1	1 000	IP0X	IP3X	IP2X	IP3X
Mechanically guided torches except for plasma cutting and submerged arc welding	141	1	1 000	IP0X	Not applicable	IPXX	IP2X
Mechanically guided submerged arc welding torches	141	1	1 000	IP0X	Not applicable	IPXX	IPXX
Manually guided plasma cutting torches	500	2,5	2 100	Plasma tip, see 7.4.2	IP4X	IP3X	IP3X
Mechanically guided plasma cutting torches	500	2,5	2 100	IP0X	Not applicable	IP2X	IP2X

^a Degree of protection for torch coupling device is tested while coupled.

^b Other parts are, for example, gas nozzle, neck.

^c Wire drive systems of motorized torches that are accessible to touch are not considered as other parts: IPXX.

7.2 Insulation resistance

The insulation resistance of a new torch shall, after the humidity treatment, be not less than the values given in Table 1.

Conformity shall be checked by the following test:

a) Humidity treatment

A humidity cabinet is maintained at a temperature t between 20 °C and 30 °C and a relative humidity between 91 % and 95 %.

The torch fitted with the cable-hose assembly (liquid-cooled torches without cooling liquid) is brought to a temperature between t and $(t + 4)$ °C and is then placed for 48 h in the humidity cabinet.

b) Insulation resistance measurement

Immediately after the humidity treatment, the torch handle and 1 m at each end of the cable-hose assembly are wiped clean and tightly wrapped in a metal foil covering the external surface of the insulation.

The insulation resistance is measured by the application of a d.c. voltage of 500 V between

- all circuits and the metal foil,
- and
- all wires and circuits intended to be isolated from each other within the torch.

The reading is made after stabilization of the measurement.

7.3 Dielectric strength

7.3.1 General requirement

The insulation shall withstand the test voltages of Table 1 without any flashover or breakdown.

The a.c. test voltage shall be of an approximate sine waveform with a peak value not exceeding 1,45 times the voltage of Table 1, having a frequency of approximately 50 Hz or 60 Hz. Alternatively, a d.c. test voltage of 1,4 times the r.m.s. test voltage may be used.

Conformity shall be checked by the following test:

Liquid-cooled torches are tested without cooling liquid.

The handles are tightly wrapped with a metal foil. The cable-hose assembly is placed in contact with a conductive surface throughout its entire length, for example wrapped around a metal cylinder or coiled on a flat metal surface. The metal foil and the conductive surface are electrically connected.

The full value of the test voltage is applied for 60 s between:

- a) the conductive surface and each isolated circuit;
- b) all circuits intended to be isolated from each other (e.g. trigger or other remote control circuits).

At the discretion of the manufacturer, the test voltage may be slowly raised to the full value.

The maximum permissible setting of the overload release shall be 100 mA. The high-voltage transformer shall deliver the prescribed voltage up to the tripping current. Tripping of the overload release is regarded as a failure.

7.3.2 Additional requirements for plasma cutting torches

In addition for manual plasma cutting torches the insulation between the handle and the cutting circuit shall withstand a test voltage of 3 750 V r.m.s. During the dielectric strength test of plasma cutting torches, the electrode and plasma tip connections should be electrically connected together.

Conformity shall be checked by the test given in 7.3.1.

7.3.3 Additional requirements for striking and stabilizing voltage rating

Torches intended for use with arc striking and stabilizing devices shall have an arc striking and stabilizing voltage rating.

For tungsten inert gas (TIG) and plasma arc welding torches the rated arc striking and/or stabilizing voltage shall be determined by the manufacturer.

For plasma cutting torches, the rated arc striking and/or stabilizing voltage shall be determined as follows:

- a) operate each power source expected to form a safe system (see item o) of Clause 13) according to manufacturer's recommendation, for example with proper consumables and gasses, and under single fault condition;
- b) measure the arc striking and/or stabilizing voltage at each end of the torch;
- c) the highest value measured, from all power sources operated in item a), will be the rated arc striking and/or stabilizing voltage.

The torch insulation shall withstand a test voltage without flashover or breakdown. Corona discharges are permitted.

Liquid-cooled torches may be tested without cooling liquid.

Conformity shall be checked by the following test:

The torch handle is tightly wrapped with a metal foil. The cable and hose assembly is placed in contact with a conductive surface throughout its entire length, for example wrapped around a metal cylinder or coiled on a flat metal surface. The metal foil and the conductive surface are electrically connected.

A test voltage with a peak voltage 20 % higher than the rated arc striking and stabilizing voltage is applied for 2 s between the torch electrode and the conductive surface, and between the torch electrode and other isolated circuits. This test voltage is either:

- a) high-frequency voltage of pulse width between 0,2 μs and 8 μs , with a repetition frequency between 50 Hz and 300 Hz; or
- b) an a.c. voltage of approximately sine waveform at 50 Hz or 60 Hz.

7.4 Protection against electric shock in normal service (direct contact)

7.4.1 Degree of protection requirements

Torches shall meet the degree of protection requirements of Table 1. In addition cable-hose assembly shall meet the degree of protection IP 3X. Torches are not intended for operation during rain or snow or equivalent conditions.

Conformity shall be checked in accordance with IEC 60529.

7.4.2 Additional requirements for plasma cutting torches

The plasma cutting torch, parts (e.g. parts typically replaced due to wear) and plasma cutting power source, recommended by the manufacturer, shall form a safe system.

Additional requirements for plasma cutting torches are given in 6.3.4 of IEC 60974-1:2012.

8 Thermal rating

8.1 General

Manual torches shall be rated at a minimum of 100 % or 60 % or 35 % duty cycle.

Mechanically guided torches shall be rated at a minimum of 100 % duty cycle.

Fume extraction torch shall be rated at the extraction flow rate defined by the manufacturer.

8.2 Temperature rise

The temperature rise of manual torches, at any point on the outer surface of the part of the handle gripped by the operator, shall not exceed 30 K.

The temperature rise of cable-hose assembly, at any point on the outer surface, shall not exceed 40 K.

After completion of the tests, the safety and operability of the torch shall not be impaired.