

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Reed switches –
Part 1-1: Generic specification – Quality assessment**

**Contacts à lames souples –
Partie 1-1: Spécification générique – Évaluation de qualité**

<https://standards.iteh.ai/catalog/standards/sist/5c4f6377-8491-44a0-b762-f43726f07984/iec-62246-1-1-2013>

STANDARD PREVIEW
(standards.iteh.ai)

Withstand



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It also gives information on projects, replaced and withdrawn publications.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

**Reed switches –
Part 1-1: Generic specification – Quality assessment**

**Contacts à lames souples –
Partie 1-1: Spécification générique – Évaluation de qualité**

<https://standards.iteh.ai/standards/iec/62246-1-1-2013>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE **XA**
CODE PRIX

ICS 29.120.70

ISBN 978-2-83220-818-2

**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
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions.....	7
3.1 Reed switch types.....	8
3.2 Tests.....	8
3.3 Abbreviations.....	8
4 Test schedules.....	9
4.1 General.....	9
4.2 Qualification approval procedures.....	9
4.3 Quality conformance inspection.....	9
4.4 Formation of inspection lots.....	9
4.5 Intervals between tests.....	9
4.6 Standard conditions for testing.....	9
4.7 Mounting of test specimens during the test.....	9
4.8 General conditions for testing.....	10
5 Characteristic values of the reed switches.....	39
5.1 Characteristics values for general data for reed switches.....	39
5.2 Standard test coil number for tests.....	40
5.3 Contact data.....	40
5.3.1 Contact reliability, electrical endurance, making and breaking current capacities and switching frequency.....	40
5.3.2 Static contact-circuit resistance.....	45
5.3.3 Mechanical endurance.....	45
5.4 Environmental data.....	45
6 Reliability – Failure rate data.....	46
7 Marking and documentation.....	46
7.1 Marking of the reed switch.....	46
7.2 Marking of the packaging.....	46
Annex A (normative) Mounting in a standard coil.....	47
Annex B (normative) Variants.....	48
Annex C (informative) Typical applications.....	49
Bibliography.....	50
Figure A.1 – Switch direction and position in a standard coil.....	47
Table 1 – Quality conformance inspection (1 of 8).....	11
Table 2 – Tests for qualification approval (1 of 17).....	19
Table 3 – Qualification approval (1 of 3).....	36
Table 4 – Characteristic values for general data for reed switches (1 of 2).....	39
Table 5 – Standard test coil number for tests for reed switches.....	40
Table 6 – Variant A of reed switches (1 of 3).....	41
Table 7 – Variant B of heavy-duty reed switches.....	44

Table 8 – Environmental data for reed switches 45
Table 9 – Reliability data for reed switches 46

Withheld

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/5c406377-8491-44a0-b762-f43726f07984/iec-62246-1-1-2013>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

REED SWITCHES –

Part 1-1: Generic specification – Quality assessment

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.

IEC 62246-1-1 has been prepared by IEC Technical Committee 94: All-or-nothing electrical relays.

This first edition cancels and replaces the first edition of IEC/PAS 62246-2-1 published in 2008. It is a technical revision.

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

- inclusion of introduction;
- update of references, terms and definitions;
- renumbering of clauses to bring them into a more logical order;
- inclusion of the generic specifications for reed switches;
- update of typical applications.

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

FDIS	Report on voting
94/358/FDIS	94/359/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 standard is intended to be used in conjunction with IEC 62246-1:2011.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62246 series, published under the general title *Reed switches*, can be found on the IEC website.

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.

IEC 62246-1-1:2013
<https://standards.iteh.ai/catalog/standards/sist/5c406377-8491-44a0-b762-f43726f07984/iec-62246-1-1-2013>

INTRODUCTION

Reed switches which are in mass production and which are widely used in practice could be classified by the following characteristics:

a) Size:

- Normal or standard reed switches with a tube more than 50 mm in length and more than 5 mm in diameter;
- Sub-miniature reed switches with a tube more than 20 mm and up to 50 mm in length and up to 5 mm in diameter;
- Miniature reed switches with a tube more than 10 mm and up to 20 mm in length and more than 2 mm and up to 5 mm in diameter;
- Micro-miniature reed switches with a tube more than 4 mm and up to 10 mm in length and more than 1,5 mm and up to 5 mm in diameter.

b) Type of switching of electric circuit:

- Closing or normally open – A type;
- Opening or normally closed – B type;
- Changeover – C type.

c) Withstand voltage level:

- Low-voltage (up to 1 000 V);
- High-voltage (more than 1 000 V).

d) Switches power:

- Low-power (up to 60 W);
- Power (100 to 1 000 W);
- High-power (more than 1 000 W).

e) Types of electric contacts:

- The tube is filled with dry air, gas mixture, vacuumized, or high pressurized.

Based on the general provisions of IEC 62246-1, this standard selects and specifies test procedures for reed switches where enhanced requirements for the verification of quality assessment specification apply.

This standard describes sampling and test schedules for qualification approval procedures, quality conformance inspection, formation of inspection lots and intervals between tests.

NOTE All type of reed switches exclude mercury reed switches.

REED SWITCHES –

Part 1-1: Generic specification – Quality assessment

1 Scope

This part of the IEC 62246 which is a quality assessment specification defines requirements and tests to reed switches for use in general and industrial applications.

This standard is intended to be used in conjunction with IEC 62246-1:2011.

This standard selects from IEC 62246-1:2011 and from other sources the appropriate test procedures to be used in detail specifications derived from this specification.

Reed switch types are specified depending on characteristic values and tests.

NOTE Mercury wetted reed switches are not covered by this standard due to their possible environmental impact.

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 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-11:1981, *Basic environmental testing procedures – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-20:2008, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-21:2006, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60068-2-78:2001, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60127-2:2003, *Miniature fuses – Part 2: Cartridge fuse-links*

IEC 61373:2010, *Railway applications – Rolling stock equipment – Shock and vibration tests*

IEC 62246-1: 2011, *Reed switches – Part 1: Generic specification*

3 Terms and definitions

The terms and definitions given in IEC 62246-1:2011, as well as the following, apply.

3.1 Reed switch types

3.1.1 type

products having similar design features and nominal dimensions manufactured by the same techniques and falling within a range of ratings specified by the manufacturer

Note 1 to entry: Mounting accessories are ignored, provided they have no significant effect on the test results.

3.1.2 variant

variation within a type having specific characteristics

3.1.3 reed switch

assembly containing contact blades, partly or completely made of magnetic material, hermetically sealed in an envelope and controlled by means of an externally generated magnetic field (e.g. an energizing quantity applied to a coil)

3.1.4 high voltage vacuum reed switch

reed switch, in which ability to switch high voltages is achieved by a high vacuum within the hermetically sealed envelope

3.1.5 heavy-duty reed switch

reed switch, in which greater switching capacity is achieved

Note 1 to entry: Blades having additional contact tips or a contact tip and spring which separate the magnetic path and electric path are typical examples of techniques to increase switching capacity.

3.2 Tests

3.2.1 routine test

conformity test made on each reed switch during or after manufacture

3.2.2 lot-by-lot test

test carried out periodically on a sample of reed switches drawn from running production at least once a month

3.2.3 periodic test

test carried out periodically on a sample of reed switches drawn from running production at least once a year and every two years

Note 1 to entry: The results from periodic tests are used verify that the level of technical performance is maintained.

3.3 Abbreviations

3.3.1 IL inspection level

inspection level which determines the relationship between the lot or batch size and the sample size

Note 1 to entry: The size of the sample drawn from the lot is dependent on the severity of the inspection level.

3.3.2

AQL

acceptance quality level

maximum percent defective that can be considered satisfactory as a process average

4 Test schedules

4.1 General

Test procedures are referenced in the corresponding subclauses of IEC 62246-1:2011.

4.2 Qualification approval procedures

- Sampling and test schedule are specified in Table 2 and Table 3.
- The tests specified and their order is mandatory.
- Tests stated in Table 2 and 3 are mandatory for the variants except when otherwise specified.

4.3 Quality conformance inspection

An initial conformity test has to be passed and then confirmed by routine tests, lot-by-lot tests and periodic tests.

Quality conformance inspection contains the tests stated in Table 1:

- Group A: routine tests;
- Groups A and B: lot-by-lot tests;
- Group C: periodic tests.

Unless otherwise stated in this specification, all tests of Table 1 are mandatory.

Where a subgroup contains cumulative tests, the order of the tests is mandatory. Specimens that have been subjected to tests denoted as destructive (D) shall not be released for delivery. Specimens that have been subjected to tests denoted as non-destructive (ND) are permitted to be released for delivery.

4.4 Formation of inspection lots

The basis for determination of sample size for the quality conformance inspection is the reed switch quantity produced during one month.

4.5 Intervals between tests

- Subgroup A0: at shipment.
- Subgroups A4 and B1: at least once a month.
- Subgroups C1: at least once a year.
- Subgroup C4: at least once every two years.

4.6 Standard conditions for testing

If not otherwise stated, all tests shall be performed under standard conditions for testing according to 7.3 of IEC 62246-1:2011.

4.7 Mounting of test specimens during the test

The following requirement shall apply for shock and vibration tests:

The reed switch shall be mounted by its normal mounting method to the test fixture, where inherent resonances have been minimized so as not to invalidate the test.

4.8 General conditions for testing

Unless otherwise stated, the test coil number and when applicable its polarity specified in Table 5 shall be used for all tests. Unless otherwise stated in this specification, the polarity shall be as specified by the manufacturer.

Withhold

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC 62246-1-1-2013
<https://standards.iteh.ai/catalog/standards/sist/5c406377-8491-44a0-b762-f43726f07984/iec-62246-1-1-2013>

Table 1 – Quality conformance inspection (1 of 8)**Group A
Subgroup A0**

For all tests in this subgroup: 100 % test.

Test no.	Test	Test conditions according to IEC 62246-1:2011	Performance requirements
A0 – 1	Visual inspection and check of dimensions (ND)	Subclause 7.4	According to Table 4 Marking as specified in 7.1
A0 – 2	Functional tests (ND)	Subclause 7.5, Procedure 1 Application points and standard test coil number: must-operate value: saturate value: 150 % of must-operate must-release value: Contact failure-to-make and failure-to-break by monitoring a current, typically 10 mA at 24 V DC max.	According to Table 5 According to Table 4
A0 – 3	Contact circuit resistance (ND)	Subclause 7.7 Application points: terminals of closed contacts Standard test coil number: Test coil voltage: 150 % of must-operate Test voltage max.: 6 V DC or 6 V AC Test current max.: 1 A	Initial value according to Table 4 According to Table 5
A0 – 4	Dielectric test (ND)	Subclause 7.8 Application points and test voltage: Duration of test: 1 min NOTE A shorter test with a higher voltage can be stated in the detail specification.	According to Table 4 Maximum leakage current: 0,5 mA
A0 – 5	Operating times (ND)	Subclause 7.10 Application points and standard test coil number: Test coil voltage: 150 % of must-operate 1) operate time 2) release time 3) operate bounce time Contact failure-to-make and failure-to-break by monitoring a current, typically 10 mA at 24 V DC max.	According to Table 5 According to Table 4
A0 – 6	Sealing (ND)	Subclause 7.21 Application points and standard test coil number: Arc time during test for heavy-duty reed switches: Test coil voltage: 150 % of must-operate Test voltage: 100 V DC – 110 V DC Test current: 0,5 A – 0,55 A Total number of operations required: 3 Leak test for reed switches and high voltage reed switch.	According to Table 5 According to Table 7

Table 1 (2 of 8)

Subgroup A4 (period: inspection lot refers to the production volume in one month)

Test no.	Test	Test conditions according to IEC 62246-1:2011	IL	AQL	Performance requirements
1	Visual inspection and check of dimensions (ND)	Subclause 7.4	S4	1,0	According to Table 4 Marking as specified in 7.1
2	Functional tests (ND)	Subclause 7.5, Procedure 1 Application points and standard test coil number: must-operate value saturate value: 150 % of must-operate must-release value Contact failure-to-make and failure-to-break by monitoring a current, typically 10 mA at 24 V DC max.			According to Table 5 According to Table 4
3	Contact-circuit resistance (ND)	Subclause 7.7 Application points: terminals of closed contacts Standard test coil number: Test coil voltage: 150 % of must-operate Test voltage max. 6 V DC or 6 V AC Test current max.: 1 A			Initial value according to Table 4 According to Table 5
4	Dielectric test (ND)	Subclause 7.8 Application points and test voltage: Duration of test: 1 min NOTE A shorter test with a higher voltage can be stated in the detail specification.			According to Table 4 Maximum leakage current: 0,5 mA
5	Operating times (ND)	Subclause 7.10 Application points and standard test coil number: Test coil voltage: 150 % of must-operate 1) operating time 2) release time 3) operate bounce time Contact failure-to-make and failure-to-break by monitoring a current, typically 10 mA at 24 V DC max.			According to Table 5 According to Table 4
6	Sealing (ND)	Subclause 7.21 Application points and standard test coil number: Arc time during test for heavy-duty reed switches: Test coil voltage: 150 % of must-operate Test voltage: 100 V DC – 110 V DC Test current: 0,5 A – 0,55 A Total number of operations required: 3 Leak test for reed switches and high-voltage vacuum reed switch.			According to Table 5 According to Table 7

Table 1 (3 of 8)**Subgroup B1** (period: inspection lot refers to the production volume of one month)

Test no.	Test	Test conditions according to IEC 62246-1:2011	IL	AQL	Performance requirements
7	Contact reliability test (D)	Subclause 7.28 Test switch type and standard test coil number: Test coil voltage: 150 % of must-operate Coil suppression: N/A Duty cycle: 50 % Switching load conditions: Monitoring conditions: Final measurements: Test 3 – contact circuit resistance Test 2 – functional tests	S3	2,5	According to Table 5 According to Table 6 According to Table 6 At each cycle during the test According to Table 4 According to Table 4

iTeh STANDARD PREVIEW
 (standards.iteh.ai)

IEC 62246-1-1:2013

<https://standards.iteh.ai/catalog/standards/sist/5c406377-8491-44a0-b762-f43726f07984/iec-62246-1-1-2013>

Withdrawing