

<b>STN</b>	<b>Laboratórne rezistory</b> <b>Časť 2: Laboratórne rezistory na striedavý prúd</b>	<b>STN</b> <b>EN IEC 60477-2</b>  35 6404
------------	--	--

Laboratory resistors - Part 2: Laboratory AC resistors

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 07/22

Obsahuje: EN IEC 60477-2:2022, IEC 60477-2:2022

Oznámením tejto normy sa od 04.05.2025 ruší  
STN EN 60477-2 (35 6404) zo septembra 2001

**135280**

EUROPEAN STANDARD

**EN IEC 60477-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2022

ICS 17.220.20; 31.040.01

Supersedes EN 60477-2:1997 + A1:1997

English Version

**Laboratory resistors - Part 2: Laboratory AC resistors  
(IEC 60477-2:2022)**

Résistances de laboratoire - Partie 2: Résistances de  
laboratoire à courant alternatif  
(IEC 60477-2:2022)

Labor-Widerstände - Teil 2: Labor-  
Wechselstromwiderstände  
(IEC 60477-2:2022)

This European Standard was approved by CENELEC on 2022-05-04. 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, 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**

**EN IEC 60477-2:2022 (E)****European foreword**

The text of document 85/822/FDIS, future edition 2 of IEC 60477-2, prepared by IEC/TC 85 "Measuring equipment for electrical and electromagnetic quantities" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60477-2:2022.

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) 2023-02-04
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-05-04

This document supersedes EN 60477-2:1997 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.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

**Endorsement notice**

The text of the International Standard IEC 60477-2:2022 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](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60477-1	-	Laboratory resistors - Part 1: Laboratory-DC resistors		-



IEC 60477-2

Edition 2.0 2022-03

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

---

**Laboratory resistors –  
Part 2: Laboratory AC resistors**

**Résistances de laboratoire –  
Partie 2: Résistances de laboratoire à courant alternatif**





**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2022 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 l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

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

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://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 corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables 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](http://webstore.iec.ch/justpublished)

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

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://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: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

---

#### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) 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 IEC

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

#### Recherche de publications IEC - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC 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.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

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

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 60477-2

Edition 2.0 2022-03

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

---

**Laboratory resistors –  
Part 2: Laboratory AC resistors**

**Résistances de laboratoire –  
Partie 2: Résistances de laboratoire à courant alternatif**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 17.220.20; 31.040.01

ISBN 978-2-8322-1092-7

**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 Resistor characterization and construction.....	8
4.1 Resistor characterization .....	8
4.2 Resistor construction .....	9
5 General requirements .....	9
5.1 DC resistance, AC resistance and time constant.....	9
5.2 Multiple resistors.....	10
5.3 Multi-dial resistors.....	10
5.4 Connecting leads .....	10
5.5 Conditions for the determination of DC and AC characteristics.....	11
6 Permissible variations.....	11
7 Further electrical and mechanical requirements.....	12
8 Information, markings and symbols.....	12
8.1 Information .....	12
8.2 Markings and symbols .....	12
Annex A (informative) Examples of markings .....	14
A.1 Example of marking for a single AC resistor.....	14
A.2 Example of marking for a five-dial AC resistor.....	14
Annex B (informative) General considerations regarding laboratory AC resistors .....	16
Annex C (informative) Equivalent circuits of an AC resistor.....	18
C.1 General.....	18
C.1.1 Two-element equivalent circuit of an AC resistor .....	18
C.1.2 Three-element equivalent circuits .....	20
C.2 Guard terminal.....	23
Annex D (informative) Construction of AC resistors.....	24
D.1 Construction and electrical definition of the impedance .....	24
D.2 Two-terminal resistor .....	24
D.3 Three-terminal resistor.....	24
D.4 Four-terminal resistor.....	25
D.5 Five-terminal resistor .....	25
D.6 Four-terminal coaxial resistor.....	26
D.7 Two-terminal-pair resistor .....	26
D.8 Four-terminal-pair resistor.....	27
Figure A.1 – Example of marking for a single AC resistor.....	14
Figure A.2 – Example of marking for a five-dial resistor .....	14
Figure C.1 – The three-element equivalent circuit of an AC resistor (Category A) .....	20
Figure C.2 – The three-element equivalent circuit of an AC resistor (Category C) .....	22
Figure D.1 – Two-terminal resistor .....	24
Figure D.2 – Three-terminal resistor .....	25
Figure D.3 – Four-terminal resistor .....	25



Figure D.4 – Five-terminal resistor .....	26
Figure D.5 – Four-terminal coaxial resistor .....	26
Figure D.6 – Two-terminal-pair resistor .....	27
Figure D.7 – Four-terminal-pair resistor .....	27
Table 1 – Limits of the AC resistance relative uncertainty .....	9
Table 2 – Limits of the AC/DC difference .....	10
Table 3 – Upper limit of the nominal range of use for frequency .....	11

# INTERNATIONAL ELECTROTECHNICAL COMMISSION

## LABORATORY RESISTORS –

### Part 2: Laboratory AC resistors

#### 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 60477-2 has been prepared by IEC technical committee 85: Measuring equipment for electrical and electromagnetic quantities. It is an International Standard.

This second edition cancels and replaces the first edition published in 1979, and Amendment 1:1997. This edition constitutes a technical revision.

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

- a) extended the AC resistor frequency range to 1 MHz;
- b) updated the terms and definitions according to IEC 60050 series;
- c) added the definition of AC/DC difference of an AC resistor;
- d) added the resistor classification according to the AC resistance or AC/DC difference index;
- e) updated the classification according to the AC resistor construction;
- f) updated the safety symbols and requirements according to IEC 60477-1;
- g) added the three-element equivalent circuits of an AC resistor in Annex C;

h) added the annex on constructions of AC resistors.

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

Draft	Report on voting
85/822/FDIS	85/825/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

A list of all parts in the IEC 60477 series, published under the general title *Laboratory resistors*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](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.

## LABORATORY RESISTORS –

### Part 2: Laboratory AC resistors

#### 1 Scope

This part of IEC 60477 applies to resistors intended as laboratory AC resistors for use over a range of frequencies from DC up to a stated frequency which is not in excess of 1 MHz. Such resistors are hereinafter referred to as "AC resistors".

In addition to satisfying the requirements of IEC 60477-1, resistors satisfying the requirements of this document are designed to have a small variation of resistance and a small phase displacement over the stated frequency range.

#### 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 60477-1, *Laboratory resistors – Part 1: Laboratory DC resistors*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**