

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Directly heated negative temperature coefficient thermistors –  
Part 1: Generic specification**

**Thermistances à coefficient de température négatif à chauffage direct –  
Partie 1: Spécification générique**





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 It also gives information on projects, replaced and withdrawn publications.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

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.

#### 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.

#### 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. Également appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### 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)



IEC 60539-1

Edition 4.0 2022-12

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Directly heated negative temperature coefficient thermistors –  
Part 1: Generic specification**

**Thermistances à coefficient de température négatif à chauffage direct –  
Partie 1: Spécification générique**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 31.040.30

ISBN 978-2-8322-6192-7

**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 .....	8
1 Scope .....	10
2 Normative references .....	10
3 Terms and definitions .....	11
4 General items .....	21
4.1 Units and symbols .....	21
4.2 Preferred values and appropriate category .....	21
4.2.1 General .....	21
4.2.2 Appropriate category .....	21
4.3 Marking .....	21
4.3.1 General .....	21
4.3.2 Marking for small size types such as surface mount NTC thermistors .....	22
4.3.3 Coding .....	22
4.4 Quality assessment procedures .....	22
5 General provisions for measurements and test methods .....	22
5.1 General .....	22
5.2 Standard atmospheric conditions for testing .....	22
5.3 Drying and recovery .....	23
5.3.1 Drying .....	23
5.3.2 Recovery .....	23
5.4 Mounting (for surface mount thermistors only) .....	23
5.4.1 General .....	23
5.4.2 Printed wiring board and land pattern .....	23
5.4.3 Mounting on board .....	23
6 Electrical tests and measurements .....	25
6.1 Zero-power resistance .....	25
6.1.1 General .....	25
6.1.2 Measurement procedures .....	25
6.1.3 Requirements .....	25
6.2 <i>B</i> -value or resistance ratio .....	25
6.2.1 General .....	25
6.2.2 Requirements .....	25
6.3 Insulation resistance (for insulated types only) .....	26
6.3.1 General .....	26
6.3.2 Test methods .....	26
6.3.3 Applied voltage .....	29
6.3.4 Requirements .....	29
6.4 Voltage proof (for insulated types only) .....	29
6.4.1 General .....	29
6.4.2 Test voltage .....	29
6.4.3 Requirements .....	29
6.5 Resistance/temperature characteristic .....	29
6.5.1 General .....	29
6.5.2 Test methods .....	29
6.5.3 Requirements .....	29
6.6 Dissipation factor ( $\delta$ ) .....	30

6.6.1	General .....	30
6.6.2	Initial measurements .....	30
6.6.3	Test methods.....	30
6.6.4	Requirements .....	31
6.7	Thermal time constant by ambient temperature change ( $\tau_a$ ).....	31
6.7.1	The hot to cold thermal time constant for ambient temperature change.....	31
6.7.2	The cold to hot thermal time constant for ambient temperature change.....	32
6.7.3	Final measurements and requirements .....	32
6.7.4	Requirements .....	33
6.8	Thermal time constant by cooling after self-heating ( $\tau_c$ ) .....	33
6.8.1	General .....	33
6.8.2	Initial measurements .....	33
6.8.3	Preconditioning.....	33
6.8.4	Test method .....	34
6.8.5	Final measurements and requirements .....	34
7	Mechanical test and measurements .....	34
7.1	Visual examination and check of dimensions .....	34
7.1.1	Visual examination .....	34
7.1.2	Dimensions.....	35
7.2	Robustness of terminations (not applicable to surface mount thermistors) .....	35
7.2.1	General .....	35
7.2.2	Initial measurements .....	35
7.2.3	Test methods.....	35
7.2.4	Test $U_{a1}$ – Tensile .....	35
7.2.5	Test $U_b$ – Bending (half the number of terminations) .....	36
7.2.6	Test $U_c$ – Torsion (remaining terminations).....	36
7.2.7	Final measurements and requirements .....	36
7.3	Vibration .....	36
7.3.1	General .....	36
7.3.2	Initial measurements .....	36
7.3.3	Test procedures.....	36
7.3.4	Final inspection, measurements and requirements.....	37
7.4	Shock .....	37
7.4.1	General .....	37
7.4.2	Initial measurements .....	37
7.4.3	Mounting .....	37
7.4.4	Test procedures.....	37
7.4.5	Final inspection, measurements and requirements.....	37
7.5	Free fall .....	37
7.5.1	General .....	37
7.5.2	Initial measurements .....	37
7.5.3	Test procedures.....	38
7.5.4	Final inspection, measurements and requirements.....	38
7.6	Shear (adhesion) test (for surface mount NTC thermistors only) .....	38
7.6.1	General .....	38
7.6.2	Initial measurements .....	38
7.6.3	Test conditions .....	38
7.6.4	Final inspection, measurements and requirements.....	38

7.7	Substrate bending test (for surface mount NTC thermistors only) .....	38
7.7.1	General .....	38
7.7.2	Initial measurements .....	38
7.7.3	Test procedures.....	38
7.7.4	Final inspection, measurements and requirements.....	39
8	Environmental and climatic tests .....	39
8.1	Rapid change of temperature .....	39
8.1.1	General .....	39
8.1.2	Initial measurements .....	39
8.1.3	Test procedures.....	39
8.1.4	Final inspection, measurements and requirements.....	39
8.2	Thermal shock .....	40
8.2.1	General .....	40
8.2.2	Initial measurements .....	40
8.2.3	Test procedures.....	40
8.2.4	Final inspection, measurements and requirements.....	40
8.3	Cold.....	40
8.3.1	General .....	40
8.3.2	Initial measurements .....	40
8.3.3	Test procedures.....	40
8.3.4	Final inspection, measurements and requirements.....	41
8.4	Dry heat.....	41
8.4.1	General .....	41
8.4.2	Initial measurements .....	41
8.4.3	Test procedures.....	41
8.4.4	Final inspection, measurements and requirements.....	41
8.5	Damp heat, steady state .....	42
8.5.1	General .....	42
8.5.2	Initial measurements .....	42
8.5.3	Test procedures.....	42
8.5.4	Recovery .....	42
8.5.5	Final inspection, measurements and requirements.....	42
8.6	Endurance .....	42
8.6.1	General .....	42
8.6.2	Endurance at room temperature with applied continuous maximum current ( $I_{max25}$ ) (for inrush current-limiting thermistors only) .....	43
8.6.3	Endurance at room temperature with applied cyclic maximum current ( $I_{max25}$ ) (for inrush current-limiting thermistors only) .....	44
8.6.4	Endurance at $T_3$ and $P_{max}$ (for other than inrush current-limiting thermistors only).....	45
8.6.5	Endurance at upper category temperature .....	46
8.6.6	Maximum permissible capacitance (for inrush current-limiting thermistors only).....	47
8.7	Salt mist .....	49
8.7.1	General .....	49
8.7.2	Initial measurements .....	49
8.7.3	Test conditions .....	49
8.7.4	Final inspection, measurements and requirements.....	49
8.8	Sealing .....	49

8.9	Composite temperature/humidity cycle .....	49
8.9.1	General .....	49
8.9.2	Initial measurements .....	49
8.9.3	Test conditions .....	50
8.9.4	Final inspection, measurements and requirements .....	50
9	Tests related to component assembly .....	50
9.1	Resistance to soldering heat .....	50
9.1.1	General .....	50
9.1.2	Preconditioning .....	50
9.1.3	Initial measurements .....	50
9.1.4	Test procedure .....	50
9.1.5	Recovery .....	50
9.1.6	Final inspection, measurement and requirements .....	51
9.2	Solderability .....	51
9.2.1	General .....	51
9.2.2	Initial measurements .....	51
9.2.3	Test procedure .....	51
9.2.4	Final inspection, measurements and requirements .....	51
9.3	Component solvent resistance .....	52
9.3.1	General .....	52
9.3.2	Initial measurements .....	52
9.3.3	Test conditions .....	52
9.3.4	Requirements .....	52
9.4	Solvent resistance of marking .....	52
9.4.1	General .....	52
9.4.2	Initial measurements .....	52
9.4.3	Test conditions .....	52
9.4.4	Requirements .....	52
Annex A (normative)	Rules for the preparation of detail specifications for directly heated NTC thermistors for electronic equipment for use within quality assessment systems .....	53
A.1	Drafting .....	53
A.2	Reference standard .....	53
A.3	Circulation .....	53
Annex B (informative)	Typical examples of mountings for measurements of directly heated thermistors .....	54
Annex Q (informative)	Quality assessment procedures .....	56
Q.1	General .....	56
Q.1.1	Scope of this annex .....	56
Q.1.2	Quality assessment definitions .....	57
Q.1.3	Rework .....	57
Q.1.4	Alternative test methods .....	57
Q.1.5	Certified test records of released lots .....	58
Q.1.6	Unchecked parameters .....	58
Q.1.7	Delayed delivery .....	58
Q.1.8	Repair .....	58
Q.1.9	Registration of approvals .....	58
Q.1.10	Manufacture outside the geographical limits .....	59
Q.2	Qualification approval (QA) procedures .....	59

Q.2.1	Eligibility for qualification approval.....	59
Q.2.2	Application for qualification approval .....	59
Q.2.3	Subcontracting .....	59
Q.2.4	Test procedure for the initial product qualification approval.....	59
Q.2.5	Granting of qualification approval .....	59
Q.2.6	Maintenance of qualification approval .....	59
Q.2.7	Quality conformance inspection .....	60
Q.3	Capability approval (CA) procedures.....	60
Q.3.1	General .....	60
Q.3.2	Eligibility for capability approval.....	60
Q.3.3	Application for capability approval .....	60
Q.3.4	Subcontracting .....	61
Q.3.5	Description of the capability .....	61
Q.3.6	Demonstration and verification of capability .....	61
Q.3.7	Granting of capability approval .....	61
Q.3.8	Maintenance of capability approval .....	61
Q.3.9	Quality conformance inspection .....	61
Q.4	Technology approval (TA) procedure .....	62
Q.4.1	General .....	62
Q.4.2	Eligibility for technology approval .....	62
Q.4.3	Application of technology approval .....	62
Q.4.4	Subcontracting .....	62
Q.4.5	Description of technology .....	62
Q.4.6	Demonstration and verification of the technology .....	62
Q.4.7	Granting of technology approval .....	62
Q.4.8	Maintenance of technology approval.....	62
Q.4.9	Quality conformance inspection .....	63
Q.5	Interpretation of sampling plans and procedures as described in IEC 60410 for use within quality assessment systems .....	63
Q.6	Rules for the preparation of detail specifications for NTC thermistors for electronic equipment for use within quality assessment systems .....	63
Q.6.1	Drafting .....	63
Q.6.2	Reference standard .....	63
Q.7	Layout of the first page of a PCP/CQC specification .....	64
Q.8	Requirements for capability approval test report .....	65
Q.8.1	General .....	65
Q.8.2	Requirements .....	65
Q.8.3	Summary of test information (for each CQC).....	65
Q.8.4	Measurement record.....	65
Q.9	Guidance for the extension of endurance tests on fixed thermistor .....	65
Q.9.1	Overview .....	65
Q.9.2	Guidelines .....	66
Annex X (informative)	Cross-references to IEC 60539-1:2016.....	67
Bibliography.....		69
Figure 1 – Typical resistance-temperature characteristic for NTC thermistors .....	14	
Figure 2 – Decreased power dissipation curve .....	16	
Figure 3 – Maximum current derating .....	18	
Figure 4 – Basic circuit for zero-power resistance measurement.....	25	

Figure 5 – Example of Method 1 for testing the insulation resistance .....	26
Figure 6 – Example of Method 2 for testing the insulation resistance (1).....	27
Figure 7 – Example of Method 2 for testing the insulation resistance (2).....	27
Figure 8 – Example of Method 3 for testing the insulation resistance .....	28
Figure 9 – Example of Method 4 for testing the insulation resistance .....	28
Figure 10 – Example of test chamber .....	30
Figure 11 – Dissipation factor measuring circuit.....	31
Figure 12 – Thermal time constant measuring circuit .....	34
Figure 13 – Endurance at room temperature with $I_{\text{max}25}$ evaluating circuit .....	43
Figure 14 – Endurance at room temperature with $I_{\text{max}25}$ evaluating circuit .....	44
Figure 15 – Maximum permissible capacitance test circuit (Method 1) .....	48
Figure 16 – Maximum permissible capacitance test circuit (Method 2) .....	48
Figure B.1 – Mounting for measurements of surface mount thermistors .....	55
Table 1 – Lower and upper category temperatures and duration of the damp heat, steady state test .....	21
Table 2 – Tensile force .....	36
Table B.1 – Recommended land dimensions.....	54

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DIRECTLY HEATED NEGATIVE TEMPERATURE  
COEFFICIENT THERMISTORS –****Part 1: Generic specification****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 60539-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2016. This edition constitutes a technical revision.

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

- a) Restructured completely to comply to ISO/IEC directives; categorization and reorganization of test methods into these categories;
- b) Annex X added for comparison to the previous edition;
- c) Some wordings, figures and references have been revised.

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

Draft	Report on voting
40/2975/FDIS	40/3016/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 60539-1 series, published under the general title *Directly heated negative temperature coefficient thermistors*, 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/publications](http://www.iec.ch/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.

## DIRECTLY HEATED NEGATIVE TEMPERATURE COEFFICIENT THERMISTORS –

### Part 1: Generic specification

#### 1 Scope

This part of IEC 60539 is applicable to directly heated negative temperature coefficient thermistors, typically made from transition metal oxide materials with semiconducting properties.

It establishes standard terms, inspection procedures and methods of test for use in sectional and detail specifications of electronic components for quality assessment or any other purpose.

#### 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 60062, *Marking codes for resistors and capacitors*

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Tests A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Tests B: Dry heat*

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

IEC 60068-2-11, *Environmental testing – Part 2-11: Tests – Test Ka: Salt mist*

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

IEC 60068-2-17, *Basic environmental testing procedures – Part 2-17: Tests – Test Q: Sealing*

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

IEC 60068-2-21:2021, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60068-2-27:2008, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-38, *Environmental testing – Part 2-38: Tests – Test Z/AD: Composite temperature/humidity cyclic test*

IEC 60068-2-45:1980, *Basis Environmental testing procedures – Part 2-45: Tests – Test XA and guidance: Immersion in cleaning solvents*  
IEC 60068-2-45:1980/AMD1:1993

IEC 60068-2-52, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 60068-2-58, *Environmental testing – Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)*

IEC 60068-2-69, *Environmental testing – Part 2-69: Tests – Test Te/Tc: Solderability testing of electronic components and printed boards by the wetting balance (force measurement) method*

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

IEC 60294, *Measurement of the dimensions of a cylindrical component with axial terminations*

IEC 61193-2, *Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packages*

IEC 60717, *Method for the determination of the space required by capacitors and resistors with unidirectional terminations*

IEC 61249-2-7, *Materials for printed boards and other interconnecting structures – Part 2-7: Reinforced base materials clad and unclad – Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test), copper-clad*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.1

##### **type**

group of products having similar design features manufactured by the same techniques and falling within the manufacturer's usual range of ratings for these products

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

Note 2 to entry: Ratings cover the combination of

- electrical ratings,
- sizes, and
- climatic category.

Note 3 to entry: The limits of the range of ratings should be given in the detail specification.

#### 3.2

##### **style**

variation within a type having specific nominal dimensions and characteristics