SLOVENSKI STANDARD
oSIST prEN 61010-2-012:2018

01-junij-2018

Varnostne zahteve za električno opremo za meritve, nadzor in laboratorijsko uporabo - 2-012. del: Posebne zahteve za opremo za klimatska in okoljska preskušanja ter drugo opremo za uravnavanje temperature

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-012: Particular requirements for climatic and environmental testing and other temperature conditioning equipment

Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 2 -012: Besondere Anforderungen an Klima- und Umwelttestgeräte und andere Temperatur-Konditionierungsgeräte

Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire - Partie 2-012: Exigences particulières pour les appareils d'essais climatiques et d'environnement, et autres appareils de conditionnement de température

Ta slovenski standard je istoveten z: **prEN 61010-2-012:2018**

ICS:

19.040	Preskušanje v zvezi z okoljem	Environmental testing
19.080	Električno in elektronsko preskušanje	Electrical and electronic testing
71.040.10	Kemijski laboratoriji. Laboratorijska oprema	Chemical laboratories. Laboratory equipment

oSIST prEN 61010-2-012:2018 **en,fr,de**

66/656/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 61010-2-012 ED2	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2018-03-23	**2018-06-15**
SUPERSEDES DOCUMENTS:	
66/649/RR	

IEC TC 66 : SAFETY OF MEASURING, CONTROL AND LABORATORY EQUIPMENT

SECRETARIAT:	SECRETARY:
United Kingdom	Mr David Hyde
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING ☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-012: Particular requirements for climatic and environmental testing and other temperature conditioning equipment

PROPOSED STABILITY DATE: 2022

NOTE FROM TC/SC OFFICERS:

This CDV is intended to align IEC 61010-2-012:2016 with IEC 61010-1:2010 and its amendment 1:2016. A revision this soon is justified by the large number of significant changes introduced by this amendment 1. With this revision IEC 61010-2-012 will be in line with the latest requirements of IEC 61010-1 + A1.

This document contains a few significant technical changes to already accepted base documents (IEC 61010-1:2010 and its amendment 1:2016 and IEC 61010-2-012:2016) that are highlighted in the foreword. Clause 6.8.3.1 is modified because otherwise it would need a specific European deviation in order to be harmonised to the LVD 2014/35/EU (ref. NAC assessment of IEC 61010-1/A1).

The changes are realised as a new 2nd edition of IEC 61010-2-012 simply because of document control; the previous edition 1.0 is based on the third edition of IEC 61010-1:2010 (without the Amendment 1:2016) and amending it to incorporate the contents of IEC 61010-1 Amendment 1 would need an unnecessary repeating of the requirements in that amendment 1 that are not particular for the equipment in the scope of IEC 61010-2-012. Furthermore, technically, one would need to follow 4 documents in parallel to get the full text of this part 2 (61010-1:2010, 61010-1 A1:2016, 61010-2-012:2016, and 61010-2-012 A1).With this approach, and when the consolidated version of IEC 61010-1:2010/A1:2016 conveniently is published, only two documents are needed.

This document is being circulated in parallel with 66/659/INF, for track changes version.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL AND LABORATORY USE –

Part 2-012: Particular requirements for climatic and environmental testing and other temperature conditioning equipment

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.

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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 61010-2-012 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

It has the status of a group safety publication in accordance with IEC Guide 104.

This second edition cancels and replaces the first edition published in 2016. It constitutes a technical revision and includes the following changes from the first edition:

- alignment with changes introduced by Amendment 1 of IEC 61010-1;
- changes related to the use of small capitals only for defined terms;
- clarifications for cooling tests in 4.4.2.10;
- requirements for overtemperature protection in 10.101, including deletion of second part of b) and c);

- changes pertaining to the accurate employment of terms of temperature, operating temperature, working temperature, application temperature, room temperature and ambient temperature in 3.5.104, 3.5.105, 4.3.1, 4.3.2, 5.4.2, 8.2.1, 8.2.2, 11.7.2.101.2, 11.7.2.101.3, 13.2.102, 14.102, 15.101, 15.102, 15.103, Introduction and many other locations. For the purpose of clarification, definition of 3.5.114, CONTROLLED TEMPERATURE is added.

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

FDIS	Report on voting
66/xxx/FDIS	66/xxx/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.

A list of all parts of the IEC 61010 series, under the general title, *Safety requirements for electrical equipment for measurement, control, and laboratory use*, may be found on the IEC website.

IEC 61010-2-012 is to be used in conjunction with the latest edition of IEC 61010-1. It was established on the basis of the third edition (2010) and its Amendment 1 (2016).

This Part 2-012. supplements or modifies the corresponding clauses in IEC 61010-1 so as to convert that publication into the IEC standard: *Particular requirements for climatic and environmental testing and other temperature conditioning equipment.*

Where a particular subclause of Part 1 is not mentioned in this Part 2, that subclause applies as far as is reasonable. where this part states "addition", "modification", "replacement", or "deletion", the relevant requirement, test specification, or note in Part 1 should be adapted accordingly.

In this standard:

1) the following print types are used:
   - requirements and definitions: in roman type;
   - NOTES: in smaller roman type;
   - *conformity and tests: in italic type;*
   - terms used throughout this standard which have been defined in Clause 3: SMALL ROMAN CAPITALS.
2) subclauses, figures, tables and notes which are additional to those in Part 1 are numbered starting from 101. Additional annexes are lettered starting from AA.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

144

145

INTRODUCTION

This standard, in conjunction with Part 2-010 and Part 2-011, addresses the specific HAZARDS associated with the heating and cooling of materials by equipment and are segregated as follows:

IEC 61010-2-010	specifically addresses the HAZARDS associated with equipment incorporating heating systems.
IEC 61010-2-011	specifically addresses the HAZARDS associated with equipment incorporating REFRIGERATING SYSTEMS.
IEC 61010-2-012	specifically addresses the HAZARDS associated with equipment incorporating both heating and REFRIGERATING SYSTEMS that interact with each other such that the combined heating and cooling system yield additional or more severe HAZARDS for the two systems than if treated separately. It also addresses the HAZARDS associated with the treatment of materials by other factors like irradiation, excessive humidity, CO_2 and MECHANICAL MOVEMENT etc.

Guidance for the application of the appropriate Part 2 standard(s)

When the equipment includes only a material heating system, and no REFRIGERATING SYSTEM or other environmental factors apply, then Part 2-010 applies without needing Part 2-011 or Part 2-012. Similarly, when the equipment includes only a REFRIGERATING SYSTEM, and no material heating system or other environmental factors apply, then Part 2-011 applies without needing Part 2-010 or Part 2-012. However, when the equipment incorporates both a material heating system, and a REFRIGERATING SYSTEM or the materials being treated in the intended application introduce significant heat into the REFRIGERATING SYSTEM, a determination should be made whether the interaction between the two systems will generate additional or more severe HAZARDS than if the systems were evaluated separately (CONTROLLED TEMPERATURE, see flow chart for selection process). If the interaction of the heating and cooling functions yields no additional or more severe HAZARDS then both Part 2-010 and Part 2-011 apply for their respective functions. Conversely, if additional or more severe HAZARDS result from the combining of the heating and cooling function, or the equipment incorporates additional material treatment factors then Part 2-012 applies but not Part 2-010 or Part 2-011.

What HAZARDS are applicable for a REFRIGERATING SYSTEM?

The typical HAZARDS for a REFRIGERATING SYSTEM (see Figure 101) consisting of a MOTOR-COMPRESSOR, a CONDENSER, an expansion device and an EVAPORATOR include but are not limited to:

– The maximum temperature of LOW-PRESSURE SIDE (return temperature) to the MOTOR-COMPRESSOR. A MOTOR-COMPRESSOR incorporates a REFRIGERANT cooled motor and it should be established that the maximum temperatures of LOW-PRESSURE SIDE under least favourable condition do not exceed the insulation RATINGS within the motor.

– The maximum pressure of LOW-PRESSURE SIDE at the inlet to the MOTOR-COMPRESSOR. The housing of the MOTOR-COMPRESSOR is exposed to this pressure and so the design RATING of the MOTOR-COMPRESSOR housing should accommodate the worst case pressures whilst providing the correct safety margin for a pressure vessel.

– The maximum temperature of HIGH-PRESSURE SIDE to the CONDENSER. The temperatures of HIGH-PRESSURE SIDE under most unfavourable conditions may present a temperature HAZARD if the OPERATOR is exposed to or electrical insulation is degraded.

– The maximum pressure of HIGH-PRESSURE SIDE at the outlet to the MOTOR-COMPRESSOR. The REFRIGERANT components downstream of the MOTOR-COMPRESSOR up to the expansion device are exposed to this pressure and so the design RATING of these components should accommodate the worst case pressures whilst providing the appropriate safety margin for a pressure vessel.

– The maximum CONTROLLED TEMPERATURES, namely, the SOAKED TEMPERATURE CONDITIONS, where the heat is being extracted from, may impact the maximum temperature of LOW-

PRESSURE SIDE to the MOTOR-COMPRESSOR as well as present a temperature HAZARD if the OPERATOR is exposed to or electrical insulation is degraded. Whether this CONTROLLED TEMPERATURE is derived from an integral heating function of the device or from the heat dissipated from the material being cooled the impact under worst case conditions should be evaluated.

– The current draw of the equipment should be established when including the worst case running conditions of the REFRIGERATING SYSTEM including any defrost cycles that may apply.

The worst case conditions should be determined for the equipment and will include both the least favourable NORMAL USE conditions as well as the most unfavourable testing results under SINGLE FAULT CONDITIONS.

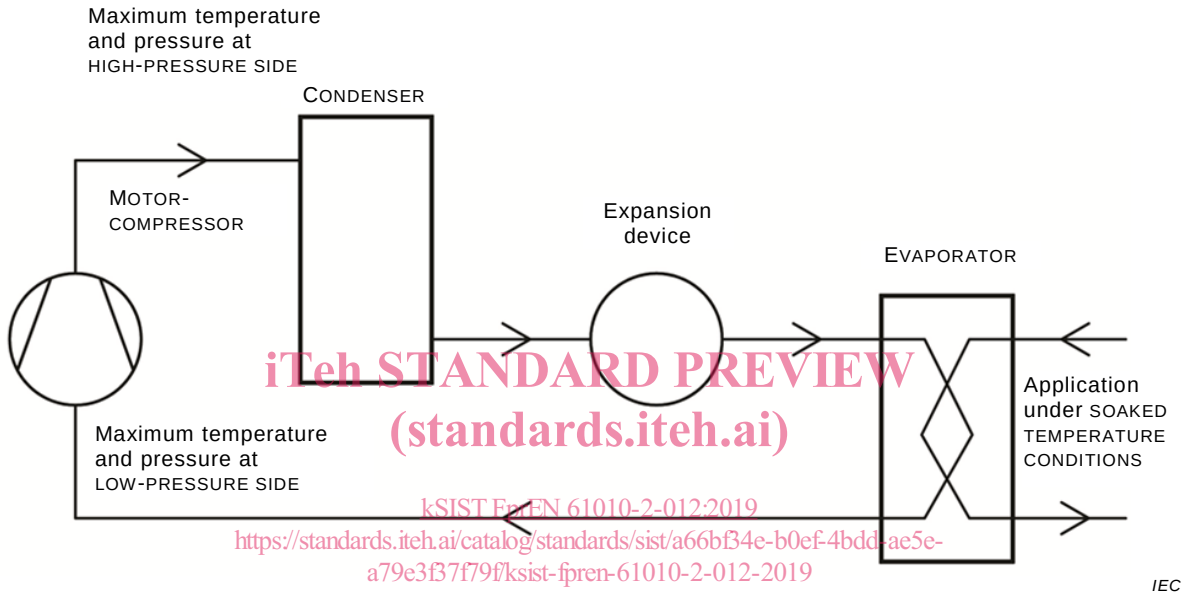
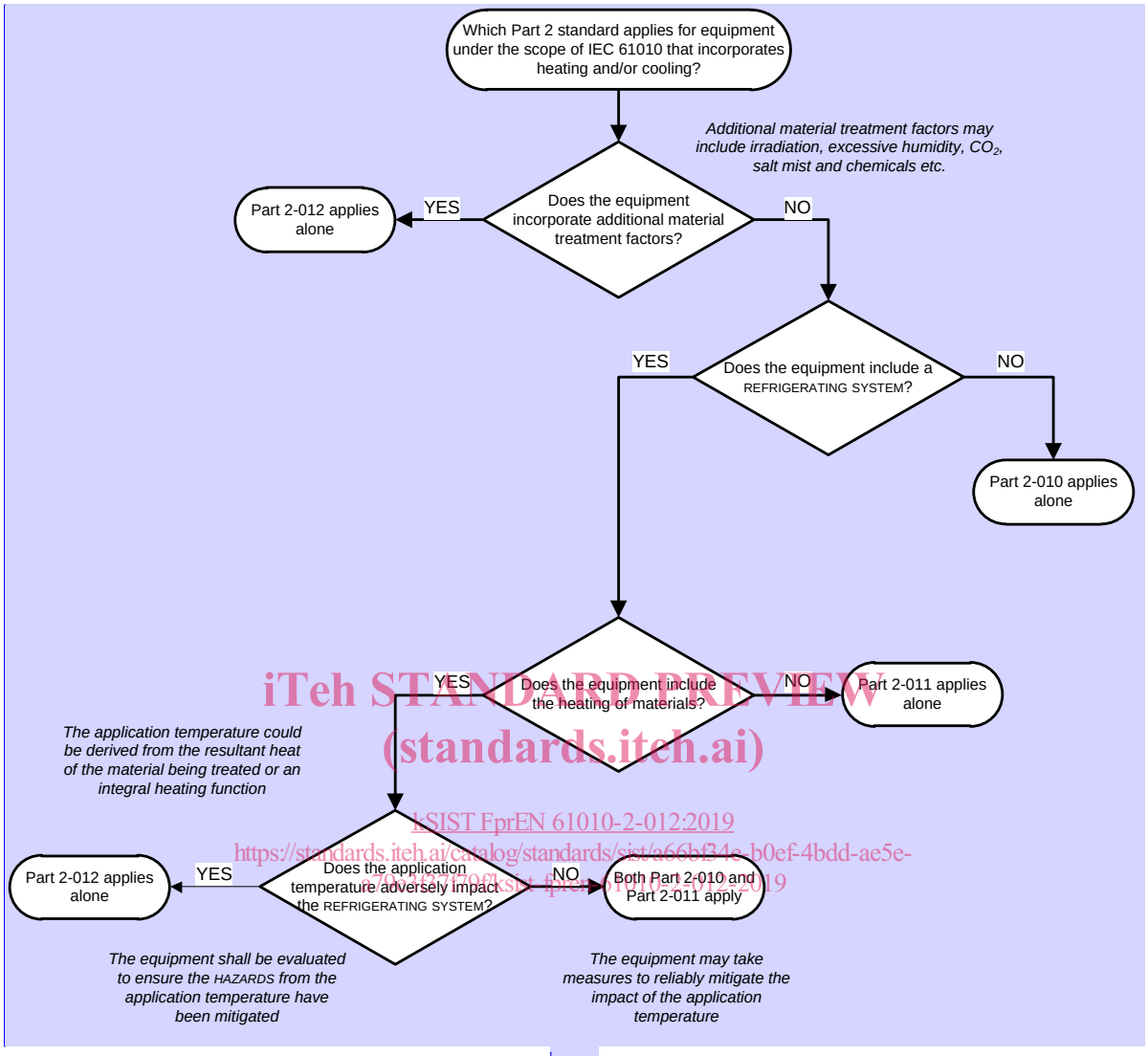


Figure 101 – Schema of a REFRIGERATING SYSTEM incorporating a CONDENSER

202 The selection process is illustrated in the following flow chart (see Figure 102).



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203 **Figure 102 – Flow chart illustrating the selection process**

204

SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL AND LABORATORY USE –

Part 2-012: Particular requirements for climatic and environmental testing and other temperature conditioning equipment

1 Scope and object

This clause of Part 1 is applicable except as follows:

1.1.1 Equipment included in scope

Replacement:

Replace the second paragraph by the following:

This Part 2 of IEC 61010 specifies safety requirements for electrical equipment and their accessories within the categories a) through c), wherever they are intended to be used, whenever that equipment incorporates one or more of the following characteristics:

– A REFRIGERATING SYSTEM that is acted on or impacted by an integral heating function such that the combined heating and cooling system generates additional and/or more severe HAZARDS than those for the two systems if treated separately.

– The materials being treated in the intended application introduce significant heat into the REFRIGERATING SYSTEM that the cooling system in the application yield additional and/or more severe HAZARDS than those for the cooling system if operated at the maximum RATED ambient alone.

– An irradiation function for the materials being treated presenting additional HAZARDS.

– A function to expose the materials being treated to excessive humidity, carbon dioxide, salt mist, or other substances which may result in additional HAZARDS.

– A function of MECHANICAL MOVEMENT presenting additional HAZARDS.

– Provision for an OPERATOR to walk-in to the operating area to load or unload the materials being treated.

Addition:

Add the following text after the last paragraph:

NOTE 101 Examples of such equipment include environmental testing and plant growth TEST CHAMBERS, refrigerating CIRCULATORS which incorporate heating, recirculating coolers for extracting heat.

If all or part of the equipment falls within the scope of one or more other Part 2 standards of IEC 61010 as well as within the scope of this standard, it should also meet the requirements of those other Part 2 standards. However, when the equipment incorporates only a REFRIGERATING SYSTEM or only a heating function or a combination of the two without introducing additional HAZARDS described in the above dashed paragraphs then the application of IEC 61010-2-011 or IEC 61010-2-010 or both, as applicable, shall be considered instead of this Part 2.

See further information in the flow chart for selection process and guidance in the INTRODUCTION.

NOTE 102 Subclause 3.1.107 and Annex BB provides definition and requirements for protection of people who are inside WALK-IN EQUIPMENT.

1.1.2 Equipment excluded from scope

Addition:

Add the following two new items after item j):

aa) equipment for the heating, cooling, and ventilation of laboratories;

bb) sterilizing equipment.

1.2 Object

1.2.1 Aspects included in scope

Addition:

Add two new items to the list:

aa) biohazards (see 13.101);

bb) hazardous chemical substances (see13.102).

2 Normative references

This clause of Part 1 is applicable, except as follows:

Additions:

IEC 60079-15:2010, *Explosive Atmospheres – Part 15: Equipment protection by type of protection "n"*

IEC 60079-20, *Explosive Atmospheres – Part 20: Material characteristics for gas and vapour classification*

IEC 60335-2-24:2010, *Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice makers*
IEC 60335-2-24:2010/AMD1:2012

IEC 60335-2-34:2012, *Household and similar electrical appliances – Safety – Part 2-34: Particular requirements for* MOTOR-COMPRESSORS
IEC 60335-2-34:2012/AMD1:2015

ISO 7010:2011,*Graphical symbols – Safety colours and safety signs – Registered safety signs*

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

3.1 Equipment and states of equipment

Addition:

Additional definitions:

3.1.101
BATH
complete device intended for application of CONTROLLED TEMPERATURES to SPECIMENS by immersion in a temperature-controlled liquid HEAT TRANSFER MEDIUM

3.1.102
CIRCULATOR
equipment intended for application of CONTROLLED TEMPERATURES to APPLICATION SYSTEM by external circulating of a temperature-controlled liquid HEAT TRANSFER MEDIUM

3.1.103
TEST CHAMBER
ENCLOSURE or space in some part of which specified conditions can be achieved, in particular, temperature, humidity, irradiation, low air pressure, mould growth and salt spray

3.1.104
COMBINED TEST CHAMBER
special TEST CHAMBER combined with function of MECHANICAL MOVEMENT, for example, for vibrating, shocking, impacting and similar dynamic tests

3.1.105
INCUBATOR
special TEST CHAMBER, primarily for incubation of microorganisms and tissue culture

3.1.106
SHAKER
equipment to disperse or dissolve one substance in another by MECHANICAL MOVEMENT without the use of blades or stirrers that might destroy the structure of the substance, in particular, shaking BATH and shaking INCUBATOR

3.1.107
WALK-IN EQUIPMENT
TEST CHAMBER or INCUBATOR, the door of which allows the OPERATOR to enter and remain inside the equipment even with the door closed

3.1.108
DRYING-OUT
period to wait or a procedure to be carried out before operation to return the equipment to NORMAL CONDITION if it has been transported or stored in humid conditions, or moved from a cold environment to a much warmer one where condensation could occur, and could cause the equipment to then fail to meet all the safety requirements of this standard

3.1.109
STANDSTILL
period to wait or a procedure to be carried before operation to return the equipment to NORMAL CONDITION if it has been transported or moved or shaken or tilted or inverted and which could cause the equipment to fail to meet all the safety requirements of this standard

3.2 Parts and accessories

Addition:

Additional definitions:

3.2.101
RESISTANCE-HEATING DEVICE
part of a resistance-heating equipment, comprising one or more heating resistors, typically composed of metallic conductors or an electrically conductive compound suitably insulated and protected

[SOURCE: IEC 60050-426:2008, 426-08-08, modified – “resistance-heating unit” has been replaced with “resistance-heating equipment”]