

SLOVENSKI STANDARD oSIST prEN ISO 80601-2-79:2023

01-julij-2023

Medicinska električna oprema - 2-79. del: Posebne zahteve za osnovno varnost in bistvene lastnosti pomožne ventilacijske opreme pri okvari ventilatorja (ISO/DIS 80601-2-79:2023)

Medical electrical equipment - Part 2-79: Particular requirements for basic safety and essential performance of ventilatory support equipment for ventilatory impairment (ISO/DIS 80601-2-79:2023)

Medizinische elektrische Geräte - Teil 2-79: Besondere Festlegungen für die grundlegende Sicherheit und die wesentlichen Leistungsmerkmale von Heimbeatmungsgeräten zur Atemunterstützung von Patienten mit Atmungsbeeinträchtigungen (ISO/DIS 80601-2-79:2023)

Appareils électromédicaux - Partie 2-79: Exigences particulières pour la sécurité de base et les performances essentielles des équipements d'assistance ventilatoire en cas de trouble ventilatoire (ISO/DIS 80601-2-79:2023)

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Medical electrical equipment —

Part 2-79:

Particular requirements for basic safety and essential performance of ventilatory support equipment for ventilatory impairment

Appareils électromédicaux —

Partie 2-79: Exigences particulières pour la sécurité de base et les performances essentielles des équipements d'assistance ventilatoire en cas de trouble ventilatoire

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Member bodies are requested to consult relevant national interests in IEC/SC 62D before casting their ballot to the e-Balloting application.

This document is circulated as received from the committee secretariat.

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Reference number ISO/DIS 80601-2-79:2023(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. www.iso.org/patents

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

ISO 80601-2-79 was prepared by Technical Committee ISO/TC 121, *Anaesthetic and respiratory equipment*, Subcommittee SC 3, *Lung ventilators and related equipment*, and Technical Committee IEC/TC 62, *Electrical equipment in medical practice*, Subcommittee SC D, *Electrical equipment*. The draft was circulated for voting to the national bodies of both ISO and IEC.

This second edition cancels and replaces the first edition (ISO 80601-2-79:2018), which has been technically revised.

The most significant changes are the following modifications:

- alignment with IEC 60601-1:2005+AMD1:2012+AMD2:2020, IEC 60601-1-2:2014+AMD1:2020
 IEC 60601-1-6:2010+AMD1:2013+AMD2:2020 and
 IEC 60601-1-8:2006+AMD1:2012+AMD2:2020;
- reformatted according to most recent Central Secretariat editing rules;
- clarified *maximum limited pressure* requirements;
- clarified high airway pressure alarm condition requirements; and
- harmonization with ISO 20417, where appropriate.

A list of all parts in the ISO 80601 series and the IEC 80601 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document specifies requirements for *ventilatory support equipment* that is intended for use in the *home healthcare environment* for *patients* who are not dependent on *ventilation* for their life support. *Ventilatory support equipment* is frequently used in locations where *supply mains* is not reliable. *Ventilatory support equipment* is often supervised by non-healthcare personnel (*lay operators*) with varying levels of training. *Ventilatory support equipment* conforming with this document can be used elsewhere (i.e. in healthcare facilities).

Ventilatory support is often needed for *patients* who have stable ventilatory needs. This document addresses *patients* who have significant respiratory dysfunction resulting in an abnormality of a sufficient degree to be noticeable by the *patient*. This is best characterized by lung functions not worse than^[35]:

- $FEV_1/FVC^1 < 70 \%$; or
- 50 % ≤ FEV₁ < 80 % predicted

where

 FEV_1 is the forced expiratory volume in 1 s, and

FVC is the forced vital capacity.

Examples of diseases that require ventilation support are

- mild to moderate Chronic Obstructive Pulmonary Disease (COPD);
- neuromuscular/ amyotrophic lateral sclerosis (ALS);
- obese patients Obese Hypoventilation Syndrome (OHS);
- Cheyne-Stokes respiration (CSR/CSA).

CSR/CSA is an abnormal pattern of breathing characterized by progressively deeper and sometimes faster breathing, followed by a gradual decrease that results in a temporary stop in breathing called an apnoea. The pattern repeats, with each cycle usually taking 30 s to 2 min.

Cardiac *patients* with CSR/CSA might be breathless without having significant reduction in FEV_1 . Reducing the work of breathing can help normalize their breathing.

This *ventilatory support equipment* is intended for *patients* who are spontaneously breathing and do not require *ventilation* for life support or intermittent periods of *ventilation* to maintain vital signs. *Ventilatory support equipment* intended for this group of *patients* typically does not require *physiological alarm conditions* as no *essential performance* exists. These *patients* can gain adequate relief from fatigue related to the work of breathing by using *ventilatory support equipment* during the night and while taking breaks during the day. This can enable a *patient* with *ventilatory impairment* to continue to move about and participate in the activities of daily living. Non-*transit-operable ventilatory support equipment* that provides ventilatory support at the bedside and beside a chair or other resting place should be adequate in this application.

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

In this document, the following print types are used:

Requirements and definitions: roman type;

 $^{^{1}}$ This is also known as the Tiffeneau-Pinelli index.

- Test specifications and terms defined in Clause 3 of the general standard², in this document or as noted: italic type;
- Informative material appearing outside of tables, such as notes, examples and references: in smaller type;
 normative text of tables is also in a smaller type;

In referring to the structure of this document, the term

- "clause" means one of the five numbered divisions within the table of contents, inclusive of all subdivisions (e.g. Clause 201 includes subclauses 201.7, 201.8);
- "subclause" means a numbered subdivision of a clause (e.g. 201.7, 201.8 and 201.9 are all subclauses of Clause 201).

References to clauses within this document are preceded by the term "Clause" followed by the clause number. References to subclauses within this particular document are by number only.

In this document, the conjunctive "or" is used as an "inclusive or" so a statement is true if any combination of the conditions is true.

The verbal forms used in this document conform to usage described in ISO/IEC Directives, Part 2. For the purposes of this document, the auxiliary verb:

- "shall" indicates a requirement;
- "should" indicates a recommendation;
- "may" indicates a permission;
- "can" is used to describe a possibility or capability; and
- "must" is used to express an external constraint.

Annex C contains a guide to the *marking* and labelling requirements in this document.

Annex D contains a summary of the symbols referenced in this document.

Requirements in this document have been decomposed so that each requirement is uniquely delineated. This is done to support automated requirements tracking.

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² The general standard is IEC 60601-1:2005+AMD1:2012, Medical electrical equipment – Part 1: General requirements for basic safety and essential performance.

Medical electrical equipment

Part 2-79:

Particular requirements for the basic safety and essential performance of ventilatory support equipment for ventilatory impairment

201.1 Scope, object and related standards

IEC 60601-1:2005+AMD1:2012+AMD2:2020, Clause 1, applies, except as follows:

201.1.1 Scope

Replacement:

NOTE 1 There is guidance or rationale for this subclause contained in Clause AA.2.

This document applies to the *basic safety* and *essential performance* of *ventilatory support equipment*, as defined in 201.3.301, for *ventilatory impairment*, as defined in 201.3.299, hereafter also referred to as *ME equipment*, in combination with its *accessories*:

intended for use in the home healthcare environment;

NOTE 2 In the *home healthcare environment*, the *supply mains* driving the *ventilatory support equipment* is often not reliable.

NOTE 3 Such *ventilatory support equipment* can also be used in professional health care facilities.

- intended for use by a lay operator;
- intended for use with *patients* who have *ventilatory impairment*, the most fragile of these *patients*, would not likely experience injury with the loss of this *artificial ventilation*; and
- not intended for *patients* who are dependent on *artificial ventilation* for their immediate life support.

EXAMPLE 1 *Patients* with mild to moderate chronic obstructive pulmonary disease (COPD).

Ventilatory support equipment is not considered to use a *physiologic closed-loop control system* unless it uses a physiological *patient* variable to adjust the *artificial ventilation* therapy settings.

This document is also applicable to those *accessories* intended by their *manufacturer* to be connected to the *breathing system* of *ventilatory support equipment* for *ventilatory impairment*, where the characteristics of those *accessories* can affect the *basic safety* or *essential performance* of the *ventilatory support equipment* for *ventilatory impairment*.

EXAMPLE 2 Breathing sets, connectors, water traps, expiratory valve, humidifier, breathing system filter, external electrical power source, distributed alarm system.

If a clause or subclause is specifically intended to be applicable to *ME equipment* only, or to *ME systems* only, the title and content of that clause or subclause will say so. If that is not the case, the clause or subclause applies both to *ME equipment* and to *ME systems*, as relevant.

Hazards inherent in the intended physiological function of *ME equipment* or *ME systems* within the scope of this document are not covered by specific requirements in this document except in IEC 60601-1:2005+AMD1:2012, 7.2.13 and 8.4.1.

NOTE 4 Additional information can be found in IEC 60601-1:2005+AMD1:2012, 4.2.

NOTE 5 See ISO/TR 21954 for guidance on the selection of the appropriate *ventilator* for a given *patient*.

This document does not specify the requirements for:

- ventilators or accessories for ventilator-dependent patients intended for critical care applications, which are given in ISO 80601-2-12;
- ventilators or accessories intended for anaesthetic applications, which are given in ISO 80601-2-13;
- ventilators or accessories intended for the emergency medical services environment, which are given in ISO 80601-2-84;
- *ventilators* or *accessories* intended for *ventilator-dependent* patients in the *home healthcare environment*, which are given in ISO 80601-2-72;
- ventilatory support equipment or accessories intended for ventilatory insufficiency, which are given in ISO 80601-2-80;
- sleep apnoea therapy *ME equipment*, which are given in ISO 80601-2-70;
- high-frequency jet *ventilators* (HFJVs)[33], which are given in ISO 80601-2-87;
- high-frequency oscillatory ventilators (HFOVs)^[22];
- respiratory high flow equipment, which are given in ISO 80601-2-90;

NOTE 5 ISO 80601-2-79 *ventilatory support equipment* can incorporate high-flow therapy operational mode, but such a mode is only for spontaneously breathing *patients*.

- user-powered resuscitators, which are given in ISO 10651-4;
- gas-powered emergency resuscitators, which are given in ISO 10651-5;
- oxygen therapy constant flow ME equipment; and
- cuirass or "iron-lung" ventilation equipment.

201.1.2 Object

IEC 60601-1:2005+AMD1:2012+AMD2:2020, 1.2 is replaced by:

The object of this document is to establish particular *basic safety* and *essential performance* requirements for *ventilatory support equipment*, as defined in 201.3.301, and its *accessories*.

Accessories are included because the combination of the ventilatory support equipment and the accessories need to be adequately safe. Accessories can have a significant impact on the basic safety or essential performance of the ventilatory support equipment.

NOTE 1 This document has been prepared to address the relevant International Medical Device Regulators Forum (IMDRF) *essential principles*^[37] and labelling^[38] guidances as indicated in Annex CC.

NOTE 2 This document has been prepared to address the relevant essential principles of safety and performance of ISO $16142-1:2016^{[10]}$ as indicated in Annex DD.

NOTE 3 This document has been prepared to address the relevant general safety and performance requirements of European regulation (EU) $2017/745^{[39]}$.

201.1.3 Collateral standards

IEC 60601-1:2005+AMD1:2012+AMD2:2020, 1.3 applies with the following addition:

This document refers to those applicable collateral standards that are listed in Clause 2 of the general standard and Clause 201.2 of this document.

IEC 60601-1-2:2014+AMD1:2020, IEC 60601-1-6:2010+AMD1:2013+AMD2:2020, and IEC 60601-1-11:2015+AMD1:2020 apply as modified in Clauses 202, 206 and 211 respectively. IEC 60601-1-3 IEC 60601-1-9 and IEC 60601-1-12 do not apply. All other published collateral standards in the IEC 60601-1 series apply as published.

201.1.4 Particular standards

IEC 60601-1:2005+AMD1:2012+AMD2:2020, 1.4 is replaced by:

In the IEC 60601 series, particular standards may modify, replace or delete requirements contained in the general standard, including the collateral standards, as appropriate for the particular *ME equipment* under consideration.

A requirement of a particular standard takes priority over the general standard.

For brevity, IEC 60601-1:2005+AMD1:2012+AMD2:2020 is referred to in this particular document as the general standard. Collateral standards are referred to by their document number.

The numbering of clauses and subclauses of this document corresponds to that of the general standard with the prefix "201" (e.g. 201.1 in this document addresses the content of Clause 1 of the general standard) or applicable collateral standard with the prefix "2xx", where xx is the final digits of the collateral standard document number (e.g. 202.4 in this document addresses the content of Clause 4 of the IEC 60601-1-2 collateral standard, 211.10 in this document addresses the content of Clause 10 of the IEC 60601-1-11 collateral standard, etc.). The changes to the text of the general standard are specified by the use of the following words:

"Replacement" means that the clause or subclause of the general standard or applicable collateral standard is replaced completely by the text of this document.

"Addition" means that the text of this document is additional to the requirements of the general standard or applicable collateral standard.

"Amendment" means that the clause or subclause of the general standard or applicable collateral standard is amended as indicated by the text of this document.

Subclauses, figures or tables that are additional to those of the general standard are numbered starting from 201.101. However, due to the fact that definitions in the general standard are numbered 3.1 through 3.154, additional definitions in this document are numbered beginning from 201.3.201. Additional annexes are lettered AA, BB, etc., and additional items aa), bb), etc.

Subclauses, figures or tables which are additional to those of a collateral standard are numbered starting from 20x, where "x" is the number of the collateral standard, e.g. 202 for IEC 60601-1-2, 203 for IEC 60601-1-3, etc.

The term "this document" is used to make reference to the IEC 60601-1:2005+AMD1:2012+AMD2:2020, any applicable collateral standards and this document taken together.

Where there is no corresponding clause or subclause in this particular document, the clause or subclause of the general standard or applicable collateral standard, although possibly not relevant, applies without modification; where it is intended that any part of the general standard or applicable collateral standard, although possibly relevant, is not to be applied, a statement to that effect is given in this particular document.

201.2 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 60601-1:2005+AMD1:2012+AMD2:2020, Clause 2, applies, except as follows:

Replacement:

ISO 15223-1:2021, Medical devices — Symbols to be used with medical device labels, labelling and information to be supplied — Part 1: General requirements

IEC 61672-1:2013, Electroacoustics — Sound level meters — Part 1: Specifications

Addition:

ISO 3744:2010, Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane

ISO 4871:1996, Acoustics — Declaration and verification of noise emission values of machinery and equipment

ISO 5356-1:2015, Anaesthetic and respiratory equipment — Conical connectors — Part 1: Cones and sockets

ISO 5367:—3, Anaesthetic and respiratory equipment — Breathing sets and connectors

ISO 7396-1:2016+AMD1:2017, Medical gas pipeline systems — Part 1: Pipeline systems for compressed medical gases and vacuum

ISO 9360-1:2000, Anaesthetic and respiratory equipment — Heat and moisture exchangers (HMEs) for humidifying respired gases in humans — Part 1: HMEs for use with minimum tidal volumes of 250 ml

ISO 9360-2:2001, Anaesthetic and respiratory equipment — Heat and moisture exchangers (HMEs) for humidifying respired gases in humans — Part 2: HMEs for use with tracheostomized patients having minimum tidal volumes of 250 ml

ISO 14937:2009, Sterilization of health care products — General requirements for characterization of a sterilizing agent and the development, validation and routine control of a sterilization process for medical devices

ISO 17664-1:2021, Processing of health care products — Information to be provided by the medical device manufacturer for the processing of medical devices — Part 1: Critical and semi-critical medical devices

ISO 17664-2:2021, Processing of health care products — Information to be provided by the medical device manufacturer for the processing of medical devices — Part 2: Non-critical medical devices

ISO 18562-1:— 4 , Biocompatibility evaluation of breathing gas pathways in healthcare applications — Part 1: Evaluation and testing within a risk management process

ISO 20417:2021, Medical devices — Information to be supplied by the manufacturer

Under preparation. Stage at the time of publication: ISO/FDIS 5367:2022.

 $^{^4\}quad$ Under preparation. Stage at the time of publication: ISO/FDIS 18562-1:2023.

ISO 23328-1:2003, Breathing system filters for anaesthetic and respiratory use — Part 1: Salt test method to assess filtration performance

 $ISO\ 23328-2:2002,\ \textit{Breathing system filters for an aesthetic and respiratory use-Part\ 2:\ Non-filtration\ aspects$

ISO 80369-1:2021, Small-bore connectors for liquids and gases in healthcare applications — Part 1: General requirements

ISO 80601-2-74:2021, Medical electrical equipment — Part 2-74: Particular requirements for basic safety and essential performance of respiratory humidifying equipment

IEC 60601-1:2005+AMD1:2012+AMD2:2020⁵, Medical electrical equipment — Part 1: General requirements for basic safety and essential performance

IEC 62366-1:2015+AMD1:2020, Medical devices — Part 1: Application of usability engineering to medical devices

IEC 62570:2014, Standard practice for marking medical devices and other items for safety in the magnetic resonance environment

IEC Guide 115:2021, Application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector

201.3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60601-1:2005+AMD1:2012+AMD2:2020 and the following apply.

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

- ISO Online browsing platform: available at http://www.iso.org/obp

IEC 60601-1:2005+AMD1:2012+AMD2:2020, Clause 3 applies, except as follows:

Addition:

201.3.201

accompanying information

information accompanying or *marked* on a medical device or *accessory* for the user or those accountable for the installation, use, *processing*, maintenance, decommissioning and disposal of the medical device or *accessory*, particularly regarding safe use

Note 1 to entry: The *accompanying information* shall be regarded as part of the medical device or *accessory*.

Note 2 to entry: The *accompanying information* can consist of the label, *marking, instructions for use, technical description*, installation manual, quick reference guide, etc.

Note 3 to entry: *Accompanying information* is not necessarily a written or printed document but could involve auditory, visual, or tactile materials and multiple media types (e.g., CD/DVD-ROM, USB stick, website).

[SOURCE: ISO 20417:2021, 3.2, modified — deleted note 4.]

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⁵ There exists a consolidated edition 3.2(2020) including IEC 60601-1:2005, its Amendment 1:2012 and its Amendment 2:2020.