
Pljučni ventilatorji za uporabo v medicini - Posebne zahteve za osnovno varnost in bistvene lastnosti - 5. del: Naprave na plin za oživljanje za nujne primere (ISO 10651-5:2006)

Lung ventilators for medical use - Particular requirements for basic safety and essential performance - Part 5: Gas-powered emergency resuscitators (ISO 10651-5:2006)

Beatmungsgeräte für die medizinische Anwendung - Besondere Festlegungen für die grundlegende Sicherheit einschließlich der wesentlichen Leistungsmerkmale - Teil 5: Gasbetriebene Notfall-Wiederbelebungsgeräte (ISO 10651 5:2006)

Ventilateurs pulmonaires à usage médical - Exigences particulières pour la sécurité de base et les performances essentielles - Partie 5: Appareils de réanimation d'urgence alimentés par gaz (ISO 10651-5:2006)

Ta slovenski standard je istoveten z: EN ISO 10651-5:2021

ICS:

11.040.10	Anestezijska, respiratorna in reanimacijska oprema	Anaesthetic, respiratory and reanimation equipment
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SIST EN ISO 10651-5:2021

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 10651-5

August 2021

ICS 11.040.10

English Version

Lung ventilators for medical use - Particular requirements for basic safety and essential performance - Part 5: Gas-powered emergency resuscitators (ISO 10651-5:2006)

Ventilateurs pulmonaires à usage médical - Exigences particulières pour la sécurité de base et les performances essentielles - Partie 5: Appareils de réanimation d'urgence alimentés par gaz (ISO 10651-5:2006)

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European foreword

The text of ISO 10651-5:2006 has been prepared by Technical Committee ISO/TC 121 "Anaesthetic and respiratory equipment" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 10651-5:2021 by Technical Committee CEN/TC 215 "Respiratory and anaesthetic equipment" the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2022, and conflicting national standards shall be withdrawn at the latest by February 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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The text of ISO 10651-5:2006 has been approved by CEN, as EN ISO 10651-5:2021 without any modification.

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INTERNATIONAL
STANDARD

ISO
10651-5

First edition
2006-02-01

**Lung ventilators for medical use —
Particular requirements for basic safety
and essential performance —**

Part 5:
Gas-powered emergency resuscitators

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*Ventilateurs pulmonaires à usage médical — Exigences particulières
pour la sécurité de base et les performances essentielles —*

Partie 5: Appareils de réanimation d'urgence alimentés par gaz

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Reference number
ISO 10651-5:2006(E)

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Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 10651-5 was prepared by Technical Committee ISO/TC 121, *Anaesthetic and respiratory equipment*, Subcommittee SC 3, *Lung ventilators and related equipment*.

This first edition of ISO 10651-5, together with ISO 10651-4:2002, cancels and replaces ISO 8382:1988, which has been technically revised.

ISO 10651 consists of the following parts, under the general title *Lung ventilators for medical use — Particular requirements for basic safety and essential performance*.

- Part 2: Home care ventilators for ventilator-dependent patients
- Part 3: Particular requirements for emergency and transport ventilators
- Part 4: Particular requirements for operator-powered resuscitators
- Part 5: Gas-powered emergency resuscitators
- Part 6: Home-care ventilatory support devices

NOTE ISO 10651-1:1993, *Lung ventilators for medical use — Part 1: Requirements*, was withdrawn in 2001 and has been revised as IEC 60601-2-12:2001, *Medical electrical equipment — Part 2-12: Particular requirements for the safety of lung ventilators — Critical care ventilators*.

Introduction

For victims whose lives are at risk from respiratory failure, in particular during cardiac arrest, resuscitation councils and associations teach that the best ultimate outcome will be achieved if there is a continuous chain of care starting with earliest possible bystander **cardiopulmonary resuscitation** and continuing until the victim can be put under professional medical care. In order to improve the care possible at the early stages of this chain, authorities and organizations are training non-specialized personnel in key situations, such as where people congregate or where there are increased risks, so that they can be available to provide a higher level of care with a minimum of delay.

There is a growing realization that the effectiveness of such intervention can be greatly enhanced by the use of certain basic **equipment**, such as that which provides ventilation whilst avoiding mouth-to-mouth contact. Simple, **gas-powered emergency resuscitators** can deliver controlled ventilation for this purpose and this document specifies the criteria they are required to satisfy.

In this part of ISO 10651, the following symbols and notations are used:

- requirements, compliance with which can be tested, and definitions: roman type;
- notes, explanations, advice, introductions, general statements and references: smaller roman type;
- test specifications: *italic type*;
- terms defined in ISO 4135:2001, IEC 60601-1:1988 or in this part of ISO 10651: **bold type**.

Throughout this part of ISO 10651, text for which a rationale is provided in Annex A is indicated by an asterisk (*).

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Lung ventilators for medical use — Particular requirements for basic safety and essential performance —

Part 5: Gas-powered emergency resuscitators

1 * Scope

This part of ISO 10651 specifies the basic safety and essential performance requirements for **gas-powered emergency resuscitators** (3.10) intended for use with humans by **first responders**. This **equipment** is intended for emergency field use and is intended to be continuously **operator** attended in **normal use**.

This part of ISO 10651 also specifies the requirements for **resuscitator sets** (3.22).

This part of ISO 10651 is not applicable to electrically-powered **resuscitators**.

NOTE ISO 10651-3 covers emergency and transport ventilators.

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2 Normative references

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The following referenced documents are indispensable for the application 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.

ISO 31 (all parts), *Quantities and units*

ISO 32, *Gas cylinders for medical use — Marking for identification of content*

ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*

ISO 4135:2001, *Anaesthetic and respiratory equipment — Vocabulary*

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

ISO 5356-2, *Anaesthetic and respiratory equipment — Conical connectors — Part 2: Screw-threaded weight-bearing connectors*

ISO 5359, *Low-pressure hose assemblies for use with medical gases*

ISO 5367, *Breathing tubes intended for use with anaesthetic apparatus and ventilators*

ISO 9170-1, *Terminal units for medical gas pipeline systems — Part 1: Terminal units for use with compressed medical gases and vacuum*

ISO 10297, *Gas cylinders — Refillable gas cylinder valves — Specification and type testing*

ISO 10524-1, *Pressure regulators for use with medical gases — Part 1: Pressure regulators and pressure regulators with flow-metering devices*

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ISO 10524-3, *Pressure regulators for use with medical gases — Part 3: Pressure regulators integrated with cylinder valves*

ISO 11607, *Packaging for terminally sterilized medical devices*

ISO 14971, *Medical devices — Application of risk management to medical devices* and Amendment 1:2003

ISO 15223:2000, *Medical devices — Symbols to be used with medical device labels, labelling and information to be supplied* and Amendment 1:2002 and Amendment 2:2004

ISO 17664, *Sterilization of medical devices — Information to be provided by the manufacturer for the processing of resterilizable medical devices*

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, *Breathing system filters for anaesthetic and respiratory use — Part 2: Non-filtration aspects*

IEC 60529:2001, *Degrees of protection provided by enclosures (IP code)*

IEC 60601-1:1988, *Medical electrical equipment — Part 1: General requirements for safety* and Amendment 1:1991 and Amendment 2:1995

3 Terms and definitions

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For the purposes of this document, the terms and definitions given in ISO 4135:2001, IEC 60601-1:1988 and the following apply. For convenience, the sources of all defined terms used in this document are given in Annex E.

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3.1 accompanying documents

documents accompanying **resuscitator** or **resuscitator sets** and containing all important information for the **user, operator**, installer or assembler of the **resuscitator**, particularly regarding safety

NOTE Adapted from IEC 60601-1:1988, definition 2.1.4.

3.2 automatic pressure-cycled resuscitator

resuscitator in which the cycling from the **inspiratory phase** to the **expiratory phase** occurs after attaining a pressure determined by the control setting

3.3 automatic time-cycled resuscitator

resuscitator in which the cycling between the **inspiratory phase** and **expiratory phase** is controlled automatically at time intervals determined by the control setting

3.4 automatic volume-cycled resuscitator

resuscitator in which the cycling from the **inspiratory phase** to the **expiratory phase** occurs after the delivery of a **delivered volume** determined by the control setting

3.5 cardiopulmonary resuscitation

combination of rescue breathing and chest compressions delivered to victims thought to be in cardiac arrest

[AHA Guidelines for Cardiopulmonary Resuscitation and Emergency Care]

3.6**clearly legible**

capable of being read by the **operator** or other relevant person with normal vision

NOTE See also 8.2.1.

3.7*** delivered volume**
 V_{del}

volume of gas delivered through the **patient connection port** during an **inspiratory phase**

3.8**demand valve**

part of the **resuscitator** that delivers a flow of gas related to a reduction of pressure generated by the **patient** at the **patient connection port**

3.9**first responder**

individual who has been trained to provide primary response to a respiratory emergency

EXAMPLE 1 Fire fighter.

EXAMPLE 2 Emergency medical technician.

3.10**gas-powered emergency resuscitator resuscitator**

portable **equipment**, powered by compressed gas, intended for immediate use to provide lung ventilation in the resuscitation of individuals who have sudden breathing difficulties

3.11**inadvertent positive end-expiratory pressure
inadvertent PEEP**

unintended positive pressure at the **patient connection port** at the end of the **expiratory phase**

3.12**intermediate hose**

hose that conducts gas between parts of the **resuscitator**

3.13**manually-cycled resuscitator**

resuscitator in which the **inspiratory phase** and **expiratory phase** are controlled by a repeated manual action of the **operator**

NOTE A **demand valve** that can be overridden with a manual trigger is, for the purposes of this document, classified as a 'manually-cycled resuscitator incorporating a demand valve' and not as a 'demand valve' as they are commonly termed in some countries.

3.14**minute volume**
 \dot{V}

volume of gas per minute entering or leaving the **patient's** lungs

3.15**operator**

person handling the **resuscitator**

NOTE Adapted from IEC 60601-1:1988, definition 2.12.17.