



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 80601-2-74:2020

Medical electrical equipment - Part 2-74:  
Particular requirements for basic safety  
and essential performance of respiratory  
humidifying equipment (ISO 80601-2-  
74:2017)

**I.S. EN ISO 80601-2-74:2020**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN ISO 80601-2-74:2020 is the adopted Irish version of the European Document EN ISO 80601-2-74:2020, Medical electrical equipment - Part 2-74: Particular requirements for basic safety and essential performance of respiratory humidifying equipment (ISO 80601-2-74:2017)

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EUROPEAN STANDARD

**EN ISO 80601-2-74**

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2020

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English Version

**Medical electrical equipment - Part 2-74: Particular requirements for basic safety and essential performance of respiratory humidifying equipment (ISO 80601-2-74:2017)**

Appareils électromédicaux - Partie 2-74: Exigences particulières pour la sécurité de base et les performances essentielles des équipements d'humidification respiratoire (ISO 80601-2-74:2017)

Medizinische elektrische Geräte - Teil 2-74: Besondere Festlegungen für die Sicherheit einschließlich der wesentlichen Leistungsmerkmale von Anfeuchtersystemen (ISO 80601-2-74:2017)

This European Standard was approved by CEN on 11 November 2019.

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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**EN ISO 80601-2-74:2020 (E)**

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>

## European foreword

The text of ISO 80601-2-74:2017 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 80601-2-74:2020 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of an identical text or by endorsement, at the latest by August 2020, and conflicting national standards shall be withdrawn at the latest by August 2020.

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.

This document supersedes EN ISO 8185:2009.

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## Endorsement notice

The text of ISO 80601-2-74:2017 has been approved by CEN as EN ISO 80601-2-74:2020 without any modification.

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**Medical electrical equipment —**

Part 2-74:

**Particular requirements for basic  
safety and essential performance of  
respiratory humidifying equipment**

*Appareils électromédicaux —*

*Partie 2-74: Exigences particulières pour la sécurité de base et  
les performances essentielles des équipements d'humidification  
respiratoire*



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<b>Contents</b>	<b>Page</b>
<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vii</b>
<b>201.1 Scope, object and related standards</b> .....	<b>1</b>
<b>201.2 Normative references</b> .....	<b>3</b>
<b>201.3 Terms and definitions</b> .....	<b>5</b>
<b>201.4 General requirements</b> .....	<b>7</b>
<b>201.5 General requirements for testing of ME EQUIPMENT</b> .....	<b>10</b>
<b>201.6 Classification of ME EQUIPMENT and ME SYSTEMS</b> .....	<b>11</b>
<b>201.7 ME EQUIPMENT identification, marking and documents</b> .....	<b>11</b>
<b>201.8 Protection against electrical HAZARDS form ME EQUIPMENT</b> .....	<b>19</b>
<b>201.9 Protection against mechanical hazards of ME EQUIPMENT and ME SYSTEMS</b> .....	<b>19</b>
<b>201.10 Protection against unwanted and excessive radiation HAZARDS</b> .....	<b>21</b>
<b>201.11 Protection against excessive temperatures and other HAZARDS</b> .....	<b>21</b>
<b>201.12 Accuracy of controls and instruments and protection against hazardous outputs</b> .....	<b>24</b>
<b>201.13 HAZARDOUS SITUATIONS and fault conditions for ME EQUIPMENT</b> .....	<b>27</b>
<b>201.14 Programmable electrical medical systems (pems)</b> .....	<b>28</b>
<b>201.15 Construction of ME EQUIPMENT</b> .....	<b>28</b>
<b>201.16 ME SYSTEMS</b> .....	<b>29</b>
<b>201.17 Electromagnetic compatibility of ME EQUIPMENT and ME SYSTEMS</b> .....	<b>29</b>
<b>201.101 BREATHING SYSTEM connectors and ports</b> .....	<b>29</b>
<b>201.102 Requirements for the BREATHING SYSTEM and ACCESSORIES</b> .....	<b>32</b>
<b>201.103 LIQUID CONTAINER</b> .....	<b>33</b>
<b>201.104 FUNCTIONAL CONNECTION</b> .....	<b>34</b>
<b>202 Electromagnetic disturbances — Requirements and tests</b> .....	<b>34</b>
<b>206 Usability</b> .....	<b>35</b>
<b>208 General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems</b> .....	<b>36</b>
<b>211 Requirements for medical electrical equipment and medical electrical systems used in the home healthcare environment</b> .....	<b>36</b>
<b>Annex C (informative) Guide to marking and labelling requirements for ME EQUIPMENT and ME SYSTEMS</b> .....	<b>38</b>
<b>Annex D (informative) Symbols on Marking</b> .....	<b>44</b>
<b>Annex AA (informative) Particular guidance and rationale</b> .....	<b>45</b>
<b>Annex BB (normative) * Determination of the accuracy of the displayed MEASURED GAS TEMPERATURE</b> .....	<b>61</b>
<b>Annex CC (normative) * Determination of the HUMIDIFICATION OUTPUT</b> .....	<b>63</b>
<b>Annex DD (normative) * Specific enthalpy calculations</b> .....	<b>67</b>

**ISO 80601-2-74:2017(E)**

<b>Annex EE (normative) Removable temperature sensors and mating ports.....</b>	<b>69</b>
<b>Annex FF (normative) * Standard temperature sensor .....</b>	<b>73</b>
<b>Annex GG (informative) Saturation vapour pressure.....</b>	<b>76</b>
<b>Annex HH (informative) Reference to the essential principles of safety and performance of medical devices in accordance with ISO 16142-1:2016<sup>[7]</sup>.....</b>	<b>77</b>
<b>Annex II (informative) Terminology — Alphabetized index of defined terms.....</b>	<b>81</b>
<b>Bibliography .....</b>	<b>85</b>

## 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 (see [www.iso.org/directives](http://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 (see [www.iso.org/patents](http://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.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/TC 121, *Anaesthetic and respiratory equipment*, Subcommittee SC 3, *Lung ventilators and related equipment* and IEC/TC 62, *Electrical equipment in medical practice*, Subcommittee SC 62D, *Electromedical equipment*.

This first edition of ISO 80601-2-74 cancels and replaces the third edition of ISO 8185:2007<sup>[1]</sup>, which has been technically revised. It also incorporates the third edition of IEC 60601-1, including amendment 1, the fourth edition of IEC 60601-1-2, the third edition of IEC 60601-1-6, including amendment 1, the second edition of IEC 60601-1-8, including amendment 1, and the second edition of IEC 60601-1-11.

The most significant changes are the following modifications:

- extending the scope to include the HUMIDIFIER and its ACCESSORIES, where the characteristics of those ACCESSORIES can affect the BASIC SAFETY and ESSENTIAL PERFORMANCE of the HUMIDIFIER, and thus not only the HUMIDIFIER itself;
- identification of ESSENTIAL PERFORMANCE for a HUMIDIFIER and its ACCESSORIES;
- modification of the humidification test PROCEDURE and the disclosure of humidification performance;

## **ISO 80601-2-74:2017(E)**

- more fully dimensioning the removable temperature sensor port and sensor;
- removal of requirements for so-called “bubble” HUMIDIFIERS as a separate document is being prepared for them<sup>[8]</sup>;

and the following additions:

- requirements for mechanical strength (via IEC 60601-1-11);
- new symbols;
- requirements for a HUMIDIFIER as a component of an ME SYSTEM;
- requirements for ENCLOSURE integrity (water ingress via IEC 60601-1-11);
- requirements for cleaning and disinfection PROCEDURES (via IEC 60601-1-11);
- requirements for BIOCOMPATIBILITY;
- requirements for USABILITY.

## **Introduction**

This document specifies requirements for respiratory humidifying equipment intended for use on PATIENTS in HOME HEALTHCARE ENVIRONMENT and in healthcare facilities. HUMIDIFIERS are used to raise the water content of gases delivered to PATIENTS. Gases available for medical use do not contain sufficient moisture and can damage or irritate the respiratory tract or desiccate secretions of PATIENTS whose upper airways have been bypassed. Inadequate humidity at the PATIENT-CONNECTION PORT can cause drying of the upper airway, or desiccation of tracheo-bronchial secretions in the tracheal or tracheostomy tube, which can cause narrowing or even obstruction of the airway<sup>[19][20]</sup>. Heat is employed to increase the water output of the HUMIDIFIER.

In addition, many HUMIDIFIERS utilize heated BREATHING TUBES in order to increase operating efficiency and reduce water loss (condensate) as well as heat loss in the BREATHING TUBE. Ventilator and anaesthesia BREATHING TUBES in common use might not withstand the heat generated by HUMIDIFIERS and BREATHING TUBE heating mechanisms.

Many HUMIDIFIER MANUFACTURERS use off-the-shelf electrical connectors for their electrically heated BREATHING TUBES. However, since different MANUFACTURERS have used the same electrical connector for different power outputs, electrically heated BREATHING TUBES can be physically, but not electrically, interchangeable. Use of improper electrically heated BREATHING TUBES has caused overheating, circuit melting, PATIENT and OPERATOR burns and fires. It was not found practical to specify the interface requirements for electrical connectors to ensure compatibility between HUMIDIFIERS and BREATHING TUBES produced by different MANUFACTURERS.

Since the safe use of a HUMIDIFIER depends on the interaction of the HUMIDIFIER with its many ACCESSORIES, this document sets total system performance requirements up to the PATIENT-CONNECTION PORT. These requirements are applicable to ACCESSORIES such as BREATHING TUBES (both heated and non-heated), temperature sensors and equipment intended to control the environment within these BREATHING TUBES.

Humidification can also be used by respiratory support ME EQUIPMENT to increase PATIENT comfort and compliance with the therapy. Examples are obstructive sleep apnoea and nasal high flow therapy equipment. The HUMIDIFICATION OUTPUT requirements of such ME EQUIPMENT is less demanding as the PATIENT'S upper airway is not bypassed.

HUMIDIFIERS are commonly used with air and air-oxygen mixtures and any HUMIDIFIER should be able to operate with these gases. Care should be taken if using other gas mixes such as helium-oxygen mixtures, as the different physical and thermal properties of these gases may disturb the operation of the HUMIDIFIER.

In this document, the following print types are used:

- Requirements and definitions: roman type;
- *Test specifications: 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;
- Terms defined in CLAUSE 3 of the general standard, in this document or as noted: small capitals;

## **ISO 80601-2-74:2017(E)**

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, etc.);
- “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 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 Annex H of the ISO/IEC Directives, Part 2. For the purposes of this document, the auxiliary verb:

- “shall” means that compliance with a requirement or a test is mandatory for compliance with this document;
- “should” means that compliance with a requirement or a test is recommended but is not mandatory for compliance with this document;
- “may” is used to describe a permissible way to achieve compliance with a requirement or test.

An asterisk (\*) as the first character of a title or at the beginning of a paragraph or table title indicates that there is guidance or rationale related to that item in Annex AA.

The attention of Member Bodies and National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised ISO or IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests. It is the recommendation of the committees that the content of this publication be adopted for implementation nationally not earlier than 3 years from the date of publication for equipment newly designed and not earlier than 5 years from the date of publication for equipment already in production.



## Medical electrical equipment —

# Part 2-74: Particular requirements for basic safety and essential performance of respiratory humidifying equipment

### 201.1 Scope, object and related standards

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

#### 201.1.1 \* Scope

*Replacement:*

This document applies to the BASIC SAFETY and ESSENTIAL PERFORMANCE of a HUMIDIFIER, also hereafter referred to as ME EQUIPMENT, in combination with its ACCESSORIES, the combination also hereafter referred to as ME SYSTEM.

This document is also applicable to those ACCESSORIES intended by their MANUFACTURER to be connected to a HUMIDIFIER where the characteristics of those ACCESSORIES can affect the BASIC SAFETY or ESSENTIAL PERFORMANCE of the HUMIDIFIER.

EXAMPLE 1 Heated BREATHING TUBES (heated-wire BREATHING TUBES) or ME EQUIPMENT intended to control these heated BREATHING TUBES (heated BREATHING TUBE controllers).

NOTE 1 Heated BREATHING TUBES and their controllers are ME EQUIPMENT and are subject to the requirements of IEC 60601-1.

NOTE 2 ISO 5367 specifies other safety and performance requirements for BREATHING TUBES.

This document includes requirements for the different medical uses of humidification, such as invasive ventilation, non-invasive ventilation, nasal high-flow therapy, and obstructive sleep apnoea therapy, as well as humidification therapy for tracheostomy PATIENTS.

NOTE 3 A HUMIDIFIER can be integrated into other equipment. When this is the case, the requirements of the other equipment also apply to the HUMIDIFIER.

EXAMPLE 2 Heated HUMIDIFIER incorporated into a critical care ventilator where ISO 80601-2-12<sup>[12]</sup> also applies.

EXAMPLE 3 Heated HUMIDIFIER incorporated into a homecare ventilator for dependent PATIENTS where ISO 80601-2-72<sup>[14]</sup> also applies.

EXAMPLE 4 Heated HUMIDIFIER incorporated into sleep apnoea therapy equipment where ISO 80601-2-70<sup>[13]</sup> also applies.

This document also includes requirements for an ACTIVE HME (HEAT AND MOISTURE EXCHANGER), ME EQUIPMENT which actively adds heat and moisture to increase the humidity level of the gas delivered from the HME to the PATIENT. This document is not applicable to a passive HME, which returns a portion of the expired moisture and heat of the PATIENT to the respiratory tract during inspiration without adding heat or moisture.

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