



IEC 60335-2-11

Edition 9.0 2024-01
COMMENTED VERSION

INTERNATIONAL STANDARD



Household and similar electrical appliances – Safety –
Part 2-11: Particular requirements for tumble dryers

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-11: Particular requirements for tumble dryers

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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This commented version (CMV) of the official standard IEC 60335-2-11:2024 edition 9.0 allows the user to identify the changes made to the previous IEC 60335-2-11:2019 edition 8.0. Furthermore, comments from IEC TC 61 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 60335-2-11 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This ninth edition cancels and replaces the eighth edition published in 2019. This edition constitutes a technical revision.

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

- a) alignment with IEC 60335-1:2020;
- b) conversion of some notes to normative text (Clause 1, Annex AA);
- c) implement new definitions to type of appliances (3.5.102, 3.5.103, 3.5.104);
- d) specific requirements have been added in 22.51 for remote operation;
- e) specific requirements have been added in Clause 24 for motor running capacitors;
- f) new modifications in Annex R;
- g) update of requirements for appliance that use flammable refrigerants in Clause 21 and Clause 22 of Annex AA;
- h) implement new requirements for non-sparking "n" electrical apparatus in Annex BB.

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

Draft	Report on voting
61/7072/FDIS	61/7096/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.

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. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts of the IEC 60335 series, under the general title: *Household and similar electrical appliances – Safety*, can be found on the IEC website.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for tumble dryers.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

NOTE 3 The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

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 in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations can need a transitional period following publication of a new, amended or revised 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 committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

IMPORTANT – The "colour inside" logo on the cover page of this document 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.

INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website

<https://www.iec.ch/tc61/supportingdocuments>

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules ~~may~~ can differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another part 2 of IEC 60335, the relevant part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 ~~Horizontal and generic standards~~ Horizontal publications, basic safety publications and group safety publications covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards. ~~For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.~~ **1**

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features which impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

- IEC standards published by TC 59 concerning methods of measuring performance;
- CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
- CISPR 14-2 concerning electromagnetic immunity;
- IEC standards published by TC 111 concerning environmental matters. **2**

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-11: Particular requirements for tumble dryers

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric **tumble dryers** intended for household and similar purposes, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances **including direct current (DC) supplied appliances**.

~~NOTE 101~~—This standard applies to the drying function of washing machines having a drying cycle.

This standard also deals with the safety of **heat pump type tumble dryers** ~~that use a refrigerating system, incorporating sealed motor compressors, for drying textile material~~. These appliances may use **flammable refrigerants**. Additional requirements for these appliances are given in **normative Annex AA**.

Appliances not intended for normal household use but which nevertheless ~~may~~ can be a source of danger to the public, such as appliances intended to be used by laymen in shops, in light industry and on farms are within the scope of this standard.

~~NOTE 102~~—Examples of such appliances are tumble dryers for communal use in blocks of flats or in laundrettes.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons.

However, in general, it does not take into account

- persons (including children) whose
 - physical, sensory or mental capabilities; or
 - lack of experience and knowledgeprevents them from using the appliance safely without supervision or instruction;
- children playing with the appliance.

~~NOTE 103~~—Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements ~~may~~ can be necessary;
- in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities.

~~NOTE 104~~—This standard does not apply to

- appliances intended exclusively for industrial purposes;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);

- appliances incorporating steam generating devices in which steam is produced at a pressure exceeding 50 kPa.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

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

IEC 60079 (all parts), *Explosive atmospheres*

IEC 60079-7:2015, *Explosive atmospheres – Part 7: Equipment protection by increased safety "e"*

IEC 60079-7:2015/AMD1:2017¹⁾

IEC 60079-15:2017, *Explosive atmospheres – Part 15: Equipment protection by type of protection "n"*

IEC 60335-2-34:2021, *Household and similar electrical appliances – Safety – Part 2-34: Particular requirements for motor-compressors*

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

ISO 817, *Refrigerants – Designation and safety classification*

ISO 7010:2019, *Graphical symbols – Safety colours and safety signs – Registered safety signs*

3 Terms and definitions

[IEC 60335-2-11:2024](https://standards.iteh.ai/catalog/standards/iec/17494031-9aeb-4ed6-af18-5be5cf120456/iec-60335-2-11-2024)

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This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

Replacement:

3.1.9 *Modification:*

Replace the first paragraph with the following:

normal operation

operation of the appliance under the following conditions:

The appliance is operated filled with textile material having a mass in the dry condition equal to the maximum load stated in the instructions.

The textile material consists of pre-washed double-hemmed cotton sheets having dimensions approximately 70 cm × 70 cm and a specific mass between 140 g/m² and 175 g/m² in the dry condition. The textile material is soaked with water having a temperature of 25 °C ± 5 °C and a mass equal to that of the textile material.

¹⁾ There exists a consolidated edition 5.1:2017 that includes IEC 60079-7:2015 and its Amendment 1:2017.

If the drying function can automatically follow the washing function in a washing machine, the appliance is not separately loaded. The appliance is operated with the maximum quantity of textile material stated in the instructions for the combined washing-drying cycle.

Note 101 to entry: Cotton having a water content not exceeding 10 % is considered to be in the dry condition. Cotton conditioned for 24 h in still air, having a temperature of $20\text{ °C} \pm 2\text{ °C}$, a relative humidity between 60 % and 70 % and a pressure between 860 mbar and 1 060 mbar, will contain approximately 7 % water.

A **steam generator** intended to be filled by hand is filled according to the instructions, water being added to maintain the steam generation.

A **steam generator** intended to be filled automatically is connected to the water mains.

3.5 Definitions relating to types of appliances

3.5.101

tumble dryer

appliance in which textile material is dried by tumbling in a rotating drum through which heated air is blown

3.5.102

condensation-type tumble dryer

tumble dryer in which the air used for the drying process is dehumidified by ~~cooling~~ passing over an ambient heat exchanger and then recirculated through the load in a closed loop system

Note 1 to entry: A **condensation-type tumble dryer** is based on resistive heating element(s).

3.5.103

heat pump type tumble dryer

tumble dryer that uses a refrigerating system incorporating sealed motor-compressors for carrying out the drying process

Note 1 to entry: A **heat pump type tumble dryer** can contain resistive heating element(s).

3.6 Definitions relating to parts of an appliance

3.6.101

steam generator

device in which steam is produced at a pressure not exceeding 50 kPa and in which the pressure drops to atmospheric pressure when the steam is not supplied

3.8 Definitions relating to miscellaneous matters

3.8.101

cool down period

final part of the **tumble dryer** cycle where the drum is continuously rotated with reduced power to the heating element and with air circulation in order to reduce the possibility of spontaneous combustion of the clothes load

Note 1 to entry: Continuous rotation does not mean rotation in same direction if the intended operation is to reverse direction in normal use.

3.8.102

cheesecloth

bleached cotton cloth running approximately 34 g/m^2 with a thread count in the range of 10 to 13 threads/cm by 9 to 12 threads/cm

3.8.103

flammable refrigerant

refrigerant with a flammability classification A2L, A2 or A3 in accordance with ISO 817

Note 1 to entry: For refrigerant blends that have more than one flammability classification, the most unfavourable classification is taken for the purposes of this definition.

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable.

6 Classification

This clause of Part 1 is applicable except as follows.

6.2 Addition:

Appliances shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

The appliance shall be marked with symbol ISO 7000-0790 (2004-01) or with the substance of the following:

Read the instructions

7.10 Addition:

If the **off position** is only indicated by letters, the word "off" shall be used.

7.12 Addition:

The instructions shall state:

- the maximum mass of dry textile material in kilograms to be used in the appliance;
- that the **tumble dryer** is not to be used if industrial chemicals have been used for cleaning;
- that the lint trap ~~has to~~ must be cleaned frequently, if applicable;
- that lint must not to be allowed to accumulate around the **tumble dryer** (not applicable for appliances intended to be vented to the exterior of the building);
- that adequate ventilation ~~has to~~ must be provided to avoid the back flow of gases into the room from appliances burning other fuels, including open fires (this instruction is not required if the **tumble dryer** discharges the air into the room).

If symbol ISO 7000-0790 (2004-01) is used, its meaning shall be explained.

The instructions shall include the substance of the following:

- Do not dry unwashed items in the tumble dryer.

- Items that have been soiled with substances such as cooking oil, acetone, alcohol, petrol, kerosene, spot removers, turpentine, waxes and wax removers should be washed in hot water with an extra amount of detergent before being dried in the tumble dryer.
- Items such as foam rubber (latex foam), shower caps, waterproof textiles, rubber backed articles and clothes or pillows fitted with foam rubber pads should not be dried in the tumble dryer.
- Fabric softeners, or similar products, should be used as specified by the fabric softener instructions.
- Remove all objects from pockets such as lighters and matches.
- Fill steam generators only with liquids specified by the manufacturer.

The instructions shall include the substance of the following warning:

WARNING: Never stop a tumble dryer before the end of the drying cycle unless all items are quickly removed and spread out so that the heat is dissipated.

The instructions for appliances for which the air temperature measured according to 11.8 exceeds 55 °C during the drying cycle shall include the substance of the following warning:

WARNING: The appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by a utility.

7.12.1 Addition:

The instructions shall state that:

- for appliances with ventilation openings in the base, a carpet must not obstruct the openings;
- exhaust air must not be discharged into a flue that is used for exhausting fumes from appliances burning gas or other fuels (this instruction is not required if the **tumble dryer** discharges the air into the room);
- the appliance must not be installed behind a lockable door, a sliding door or a door with a hinge on the opposite side to that of the **tumble dryer**, in such a way that a full opening of the **tumble dryer** door is restricted.

If the instructions state that the **tumble dryer** can be placed on top of a washing machine, they shall state which washing machines are suitable. Instructions shall be given for the assembly of the **tumble dryer** and washing machine. The instructions shall state how to obtain any fixing attachments required, unless they are supplied with the appliance.

7.14 Addition:

The height of symbol ISO 7000-0790 (2004-01) shall be at least 15 mm.

7.15 Addition:

Symbol ISO 7000-0790 (2004-01), or the marking "Read the instructions", shall be readily visible when the appliance is installed as in normal use.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.1 Addition:

For parts of appliances situated not more than 850 mm above the floor after installation or in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied.