

INTERNATIONAL STANDARD

IEC
60335-2-43

Third edition
2002-10

Household and similar electrical appliances – Safety –

Part 2-43: Particular requirements for clothes dryers and towel rails

*Appareils électrodomestiques et analogues –
Sécurité –*

*Partie 2-43:
Règles particulières pour les appareils de séchage
du linge et les sèche-serviettes*



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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-43: Particular requirements for clothes dryers and towel rails**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

This part of International Standard IEC 60335 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This third edition cancels and replaces the second edition published in 1995. It constitutes a technical revision.

The text of this part of IEC 60335 is based on the following documents:

FDIS	Report on voting
61/2218/FDIS	61/2293/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 part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fourth edition (2001) 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: Safety requirements for electric clothes dryers and towel rails.

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 publication will remain unchanged until 2004. At this date, the publication will be

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

The following differences exist in the countries indicated below.

- 11.101: The temperature rise limits are lower (USA).
- 19.13: The temperature rise of textiles is not measured (USA).
- 24.101: Self-resetting thermal cut-outs are allowed if they have been tested for reliability (USA).

A bilingual version of this standard may be issued at a later date.

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.

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.

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 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.

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.

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 that 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.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-43: Particular requirements for clothes dryers and towel rails

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric clothes dryers for drying textiles on racks located in a warm airflow and to electric towel rails, for household and similar purposes, their **rated voltage** being not more than 250 V.

NOTE 101 The clothes racks may be fixed or free-standing in a cabinet. The air circulation may be natural or forced.

Appliances not intended for normal household use but that nevertheless may 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.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

- the use of appliances by young children or infirm persons without supervision;
- playing with the appliance by young children.

NOTE 102 Attention is drawn to the fact that

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

NOTE 103 This standard does not apply to

- tumble dryers (IEC 60335-2-11);
- 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).

2 Normative references

This clause of Part 1 is applicable.

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 Replacement:

normal operation

operation of the appliance under the following conditions

Textiles positioned over the racks or rails in accordance with the instructions. The textiles are pre-washed, double-hemmed cotton sheets having dimensions approximately 700 mm x 700 mm and a specific mass between 140 g/m² and 175 g/m² in the dry condition.

Four layers of textiles are used for appliances having a heated surface supporting the textiles. One layer is used for appliances in which the textiles are dried by a warm airflow.

NOTE 101 In case of doubt, the cotton sheets are conditioned for at least 24 h at a temperature of $20\text{ °C} \pm 5\text{ °C}$ and a relative humidity of $(60 \pm 5)\%$.

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 IPX1.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.12 Addition:

The instructions for clothes dryers shall include the substance of the following:

WARNING: This appliance is intended only for drying textiles washed in water.

8 Protection against access to live parts

This clause of Part 1 is applicable.

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable.

11 Heating

This clause of Part 1 is applicable except as follows.

11.1 Addition:

Towel rails are also subjected to the test of 11.101.

11.4 Addition:

*If the temperature rise limits are exceeded in appliances incorporating motors, transformers or **electronic circuits**, and the power input is lower than the **rated power input**, the test is repeated with the appliance supplied at 1,06 times **rated voltage**.*

11.6 Addition:

Combined appliances are operated as **heating appliances**.

11.7 Replacement:

Appliances are operated until steady conditions are established.

11.8 Addition:

The temperature rise of the textiles shall not exceed 75 K.

*The temperature rise limits of motors, transformers and components of **electronic circuits**, including parts directly influenced by them, may be exceeded when the appliance is operated at 1,15 times **rated power input**.*

For oil-filled appliances, the temperature rise of parts in contact with oil is not measured.

11.101 Towel rails are operated at **rated power input** but without textiles.

The temperature rises of the surface shall not exceed the following values

- | | |
|---|------|
| – metal and painted metal | 60 K |
| – vitreous enamelled metal | 65 K |
| – glass and ceramic surfaces | 70 K |
| – plastic having a thickness exceeding 0,3 mm | 85 K |

The temperature rise limit of 85 K also applies for plastic material having a metal finish of thickness less than 0,1 mm.

NOTE When the thickness of the plastic coating does not exceed 0,3 mm, the temperature rise limits of the supporting material apply.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.2 Replacement:

Drying cabinets, in which electrical components are located below the textiles, shall be constructed so that dripping water does not affect their electrical insulation.

Compliance is checked by the following test.

*Drying cabinets with **type X attachment**, except those having a specially prepared cord, are fitted with the lightest permissible type of flexible cord of the smallest cross-sectional area specified in Table 13.*

Water containing approximately 1 % NaCl is dripped at a rate of 12 ml/min from a height just above the top rail. It is uniformly distributed over the usable area, 3 l of solution being used for each cubic metre of usable volume.

NOTE 101 The following dimensions are used to calculate the usable volume:

- height, maximum distance between the top of the uppermost rail and the top surface of the heating unit;
- width, length of the longest rail;
- depth, overall horizontal distance between the outer rails.

*The appliance shall then withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

16 Leakage current and electric strength

This clause of Part 1 is applicable

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 Addition:

For each of the tests, new textiles are used.

19.2 Addition:

For appliances having a heated surface that supports the textiles, eight layers of textiles are used. For appliances in which the textiles are dried by a warm airflow, two layers of textiles are placed on the heating element guard or over the air inlet if the heating unit is located above the textiles.

The test is carried out with the textiles completely covering the guard or air inlet and then with the textiles covering 80 % of the area of the guard or air inlet.

NOTE 101 Different positions of the textiles are taken into account.

Appliances incorporating a fan are also tested without the motor operating, the guard or air inlet being uncovered.

Appliances in which the heating unit is located above the textiles are also tested with two layers of textiles placed over the rails. The rails are raised by 50 mm above their normal position or through the maximum distance allowed by the construction, whichever is less.

Wall-mounted appliances that are folded when stored are also tested in the folded position without textiles.

19.13 Addition:

The temperature rise of the textiles shall not exceed 150 K.

The textiles shall not be significantly scorched.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.101 Wall-mounted clothes dryers of the folding type shall withstand the forces likely to occur in normal use.

Compliance is checked by the following test.

*The appliance is loaded as specified for **normal operation** or without textiles, whichever is more unfavourable. A force of 50 N is applied to each critical part of the supporting mechanism in turn.*

The appliance shall not collapse.

21 Mechanical strength

This clause of Part 1 is applicable.

22 Construction

This clause of Part 1 is applicable.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.101 Thermal cut-outs incorporated in appliances for compliance with 19.4 shall not be self-resetting.

Compliance is checked by inspection.