

INTERNATIONAL STANDARD

IEC
60335-2-13

Fifth edition
2002-10

**Household and similar electrical appliances –
Safety –**

**Part 2-13:
Particular requirements for deep fat fryers,
frying pans and similar appliances**

*Appareils électrodomestiques et analogues –
Sécurité –*

*Partie 2-13:
Règles particulières pour les friteuses, les poêles à frire
et appareils analogues*



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CONTENTS

FOREWORD	3
INTRODUCTION	5
1 Scope	6
2 Normative references.....	6
3 Definitions	6
4 General requirement.....	7
5 General conditions for the tests	7
6 Classification	7
7 Marking and instructions	7
8 Protection against access to live parts	7
9 Starting of motor-operated appliances	8
10 Power input and current.....	8
11 Heating.....	8
12 Void	8
13 Leakage current and electric strength at operating temperature	8
14 Transient overvoltages.....	8
15 Moisture resistance.....	8
16 Leakage current and electric strength	9
17 Overload protection of transformers and associated circuits.....	9
18 Endurance	9
19 Abnormal operation.....	9
20 Stability and mechanical hazards.....	10
21 Mechanical strength.....	10
22 Construction	10
23 Internal wiring	11
24 Components	11
25 Supply connection and external flexible cords.....	11
26 Terminals for external conductors	11
27 Provision for earthing.....	11
28 Screws and connections	12
29 Clearances, creepage distances and solid insulation	12
30 Resistance to heat and fire	12
31 Resistance to rusting	12
32 Radiation, toxicity and similar hazards	12
Annexes.....	13
Bibliography.....	13

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –**
**Part 2-13: Particular requirements for deep fat fryers,
frying pans and similar appliances**

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

This fifth edition cancels and replaces the fourth edition published in 1993 and its amendment 1 (1993) and amendment 2 (1999). It constitutes a technical revision.

The text of this standard is based on the following documents:

FDIS	Report on voting
61/2202/FDIS	61/2283/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 deep fat fryers, frying pans and similar appliances.

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 2003. 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.

- 3.1.9: Normal operation is different (USA).
- 7.1: Non-immersible appliances are required to be marked with a warning against immersion (Canada and USA).
- 7.1: Appliances are required to be marked with the identity of the appropriate connector when it incorporates a thermostat (Canada and USA).
- 11.2: Plywood 9,5 mm thick is used for the test corner (USA).
- 11.7: Appliances are operated until a specified quantity of food is cooked (USA).
- 11.8: The oil temperatures are higher (USA).
- 19.2: The test is different (USA).
- 19.13: The oil temperatures are higher (USA).
- 19.101: The test is not carried out (USA).
- 25.7: The types of cords are different (USA).
- 30.2: For frying pans, 30.2.3 applies (USA).

A bilingual version of this publication 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 2-13: Particular requirements for deep fat fryers, frying pans and similar appliances

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric deep fat fryers, frying pans and other appliances in which oil is used for cooking, and intended for household use only, their **rated voltage** being not more than 250 V.

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 101 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 102 This standard does not apply to

- deep fat fryers having a recommended maximum quantity of oil exceeding 4 l (IEC 60335-2-37);
- commercial multi-purpose cooking pans (IEC 60335-2-39);
- 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

Deep fat fryers are operated filled with frying oil to the minimum oil level marked on the appliance.

Frying pans are operated filled with frying oil to a height of 10 mm above the highest point of the heated surface until the temperature of the oil attains 250 °C at the centre of the heated surface. The temperature of the oil is maintained at 250 °C ± 15 °C, or at the highest temperature allowed by the **thermostat** if this is lower. If the appliance does not have a **thermostat**, the temperature is maintained by switching the supply on and off.

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.2 Addition:

NOTE 101 If the test of 15.101 has to be carried out, three additional samples are required.

5.101 *Deep fat fryers that can also be used as frying pans are tested as deep fat fryers or as frying pans, whichever is more unfavourable.*

NOTE Deep fat fryers incorporating heating elements that do not project into the oil container, and are not marked with the minimum oil level, are considered to be usable as frying pans.

6 Classification

This clause of Part 1 is applicable.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

Deep fat fryers shall be marked with the maximum oil level. They shall also be marked with the minimum oil level, unless they can be used as frying pans.

Appliances intended to be partially immersed in water for cleaning shall be marked with the maximum level of immersion and with the substance of the following:

Do not immerse beyond this level.

7.12 Addition:

The instructions for appliances incorporating an appliance inlet, and intended to be partially or completely immersed in water for cleaning, shall state that the connector must be removed before the appliance is cleaned and that the appliance inlet must be dried before the appliance is used again.

The instructions for **portable deep fat fryers** and other appliances not intended to be immersed in water for cleaning shall state that the appliance must not be immersed.

NOTE 101 **Portable frying pans** are considered to be appliances that are intended to be immersed in water for cleaning.

The instructions for appliances intended to be used with a connector incorporating a **thermostat** shall state that only the appropriate connector must be used.

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.

11.2 Modification:

Portable appliances are placed away from the walls of the test corner.

11.3 Addition:

The temperature rise of the oil in deep fat fryers is determined by means of thermocouples attached to disks of copper or brass, 15 mm in diameter and 1 mm thick.

11.7 Replacement:

Appliances are operated until steady conditions are established.

11.8 Addition:

*The temperature of the oil in deep fat fryers and similar appliances is measured at least 10 mm from the wall of the container and 10 mm above the bottom. However, the temperature is measured 10 mm above the highest point of heating elements if they are located in the container. The temperature shall not exceed 225 °C, except that a temperature of 243 °C is allowed for the first cycle of operation of the **thermostat**.*

The temperature rise of parts of deep fat fryers likely to be contacted by spilt oil shall not exceed 275 K.

*When an appliance connector incorporates a **thermostat**, the temperature rise limit for the pins of the inlet does not 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.

15.101 Appliances intended to be partially or completely immersed in water for cleaning shall have adequate protection against the effects of immersion.

Compliance is checked by the following tests, which are carried out on three additional appliances.

*The appliances are operated under **normal operation** at 1,15 times **rated power input**, until the **thermostat** operates for the first time. Appliances without a **thermostat** are operated until steady conditions are established. The appliances are disconnected from the supply, any appliance connector being withdrawn. They are then completely immersed in water containing approximately 1 % NaCl and having a temperature between 10 °C and 25 °C, unless they are marked with the maximum level of immersion, in which case they are immersed 50 mm deeper than this level.*

After 1 h, the appliances are removed from the saline solution, dried and subjected to the leakage current test of 16.2.

NOTE Care is to be taken to ensure that all moisture is removed from the insulation around the pins of appliance inlets.

This test is carried out four more times, after which the appliances shall withstand the electric strength test of 16.3, the voltage being as specified in Table 4.

*The appliance having the highest leakage current after the fifth immersion is dismantled and inspection shall show that there is no trace of liquid on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

*The remaining two appliances are operated under **normal operation** at 1,15 times **rated power input** for 240 h. After this period, the appliances are disconnected from the supply and immersed again for 1 h. They are then dried and subjected to the electric strength test of 16.3, the voltage being as specified in Table 4.*

*Inspection shall show that there is no trace of liquid 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:

*Deep fat fryers incorporating a **thermal cut-out** of the capillary type are also subjected to the test of 19.101.*

*Deep fat fryers with **detachable heating elements** are also subjected to the test of 19.102.*

Frying pans are not subjected to the tests of 19.4 and 19.5.

19.2 Addition:

Deep fat fryers are filled with oil to a height of 10 mm above the highest point of the bottom of the container. If the heating element is located in the container, the appliance is filled to a height of 10 mm above the highest point of the heating element. If the container has an inclined bottom, the quantity of oil is 60 % of that required to fill the appliance to the minimum marked level.

Frying pans are operated without oil in the container.

19.3 Modification:

*Frying pans are tested at 1,15 times **rated power input**, the **thermostat** being adjusted to its highest setting.*

19.13 Addition:

*The temperature of the oil in deep fat fryers and the temperature at the centre of the heated surface of frying pans shall not exceed 295 °C. During the tests of 19.2 and 19.3, the temperature of the oil in deep fat fryers, measured 5 mm below the oil level and at a distance of not less than 5 mm from any surface inside the container, shall not exceed 265 °C. However, a temperature of 280 °C is allowed for the first cycle of operation of the **thermostat**.*

A temperature rise of 200 K is allowed for the floor and the walls of the test corner during the first minute of the test of 19.102.

19.101 *Deep fat fryers incorporating a **thermal cut-out** of the capillary type are tested as specified in 19.4 but with the capillary tube ruptured.*

19.102 ***Detachable heating elements**, which are not automatically disconnected from the supply when they are removed from the deep fat fryer, are placed on the floor of the test corner in the most unfavourable position and operated at **rated power input**.*

20 Stability and mechanical hazards

This clause of Part 1 is applicable.

21 Mechanical strength

This clause of Part 1 is applicable.

22 Construction

This clause of Part 1 is applicable except as follows.

22.35 Addition:

NOTE 101 Handles and similar parts of accessories that do not incorporate electrical components are not considered likely to become live in the event of an insulation fault.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.5 Addition:

*For appliance couplers incorporating **thermostats, thermal cut-outs** or fuses in the connector, IEC 60320-1 is applicable except that*

- *the earthing contact of the connector is allowed to be accessible, provided that this contact is not likely to be gripped during insertion or withdrawal of the connector;*
- *the temperature required for the test of Clause 18 is that measured on the pins of the appliance inlet during the heating test of Clause 11 of this standard;*
- *the breaking-capacity test of Clause 19 is carried out using the inlet of the appliance;*
- *the temperature rise of current-carrying parts specified in Clause 21 is not determined.*

NOTE 101 Thermal controls are not allowed in connectors complying with the standard sheets of IEC 60320-1.

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

Compliance is checked by inspection.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 Addition:

Appliances incorporating an appliance inlet that does not comply with the standard sheets of IEC 60320-1 shall be supplied with a cord set.

25.7 Addition:

Rubber sheathed cords shall be not lighter than ordinary polychloroprene sheathed cord (code designation 60245 IEC 57).

25.14 Not applicable.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

29.2 Addition:

The microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2 Addition:

For frying pans, 30.2.2 is applicable. For deep fat fryers, 30.2.3 is applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

Annexes

The annexes of Part 1 are applicable.

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-37, *Household and similar electrical appliances – Safety – Part 2-37: Particular requirements for commercial electric deep fat fryers*

IEC 60335-2-39, *Household and similar electrical appliances – Safety – Part 2-39: Particular requirements for commercial electric multi-purpose cooking pans*



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