

มาตรฐานผลิตภัณฑ์อุตสาหกรรม

THAI INDUSTRIAL STANDARD

มอก. 1594 – 2553

IEC 60335 – 2 – 39(2008 – 06)

ความปลอดภัยของเครื่องใช้ไฟฟ้า  
สำหรับใช้ในที่อยู่อาศัยและงานที่มีลักษณะคล้ายกัน  
ข้อกำหนดเฉพาะสำหรับกระทะไฟฟ้า  
อเนกประสงค์เชิงพาณิชย์

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES - SAFETY -  
PART 2-39 : PARTICULAR REQUIREMENTS FOR COMMERCIAL ELECTRIC MULTI-PURPOSE  
COOKING PANS

สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

กระทรวงอุตสาหกรรม

ICS 13.120, 97.040.50

ISBN 978-616-231-127-7

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สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม  
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โทรศัพท์ 02 202 3300

ประกาศในราชกิจจานุเบกษาฉบับประกาศและงานทั่วไปเล่ม 128 ตอนพิเศษ 3ง  
วันที่ 12 มกราคม พุทธศักราช 2554

มาตรฐานผลิตภัณฑ์อุตสาหกรรม ความปลอดภัยของเครื่องใช้ไฟฟ้าสำหรับใช้ในที่อยู่อาศัยและงานที่มีลักษณะคล้ายกัน  
ข้อกำหนดเฉพาะสำหรับกระทะไฟฟ้าอเนกประสงค์เชิงพาณิชย์ นี้ ได้ประกาศใช้ครั้งแรกเป็นมาตรฐานผลิตภัณฑ์  
อุตสาหกรรม ความปลอดภัยของเครื่องใช้ไฟฟ้าสำหรับใช้ในที่อยู่อาศัยและงานที่มีลักษณะคล้ายกัน ข้อกำหนดเฉพาะ  
สำหรับกระทะไฟฟ้าอเนกประสงค์เชิงพาณิชย์เฉพาะด้านความปลอดภัย มาตรฐานเลขที่มอก.1594-2541 ในราชกิจจานุ  
เบกษา ฉบับประกาศทั่วไป เล่ม 116 ตอนพิเศษ 87ง วันที่ 29 ตุลาคม พุทธศักราช 2542 ต่อมาได้พิจารณา  
เห็นสมควรแก้ไขปรับปรุงเพื่อให้ทันสมัยและเป็นไปตามเอกสารอ้างอิงฉบับล่าสุด จึงได้แก้ไขปรับปรุงโดยการยกเลิก  
มาตรฐานเดิมและกำหนดมาตรฐานนี้ขึ้นใหม่

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้กำหนดขึ้นโดยรับ IEC 60335-2-39(2008-06) Household and similar  
electrical appliances – Safety – Part 2-39: Particular requirements for commercial electric multi-purpose cooking  
pans มาใช้ในระดับเหมือนกันทุกประการ (identical) โดยใช้ IEC ฉบับภาษาอังกฤษเป็นหลัก

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้กำหนดขึ้นเพื่อให้ทันกับความต้องการของผู้ใช้และจะได้แปลเป็นภาษาไทยในโอกาส  
อันควร หากมีข้อสงสัยโปรดติดต่อสอบถามที่สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

คณะกรรมการมาตรฐานผลิตภัณฑ์อุตสาหกรรมได้พิจารณามาตรฐานนี้แล้ว เห็นสมควรเสนอรัฐมนตรีประกาศตาม  
มาตรา 15 แห่งพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม พ.ศ. 2511



## ประกาศกระทรวงอุตสาหกรรม

ฉบับที่ 4260 ( พ.ศ. 2553 )

ออกตามความในพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม

พ.ศ. 2511

เรื่อง ยกเลิกมาตรฐานผลิตภัณฑ์อุตสาหกรรม

ความปลอดภัยของเครื่องใช้ไฟฟ้าสำหรับใช้ในที่อยู่อาศัยและงานที่มีลักษณะคล้ายกัน  
ข้อกำหนดเฉพาะสำหรับกระทะไฟฟ้าอเนกประสงค์เชิงพาณิชย์ เฉพาะด้านความปลอดภัย

และกำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรม

ความปลอดภัยของเครื่องใช้ไฟฟ้าสำหรับใช้ในที่อยู่อาศัยและงานที่มีลักษณะคล้ายกัน

ข้อกำหนดเฉพาะสำหรับกระทะไฟฟ้าอเนกประสงค์เชิงพาณิชย์

โดยที่เป็นการสมควรปรับปรุงมาตรฐานผลิตภัณฑ์อุตสาหกรรม ความปลอดภัยของเครื่องใช้ไฟฟ้า  
สำหรับใช้ในที่อยู่อาศัยและงานที่มีลักษณะคล้ายกัน ข้อกำหนดเฉพาะสำหรับกระทะไฟฟ้าอเนกประสงค์  
เชิงพาณิชย์ เฉพาะด้านความปลอดภัย มาตรฐานเลขที่ มอก.1594-2541

อาศัยอำนาจตามความในมาตรา 15 แห่งพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม พ.ศ. 2511  
รัฐมนตรีว่าการกระทรวงอุตสาหกรรมออกประกาศยกเลิกประกาศกระทรวงอุตสาหกรรม ฉบับที่ 2475  
(พ.ศ.2542) ออกตามความในพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม พ.ศ.2511  
เรื่อง กำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรม ความปลอดภัยของเครื่องใช้ไฟฟ้าสำหรับใช้ในที่อยู่อาศัย  
และงานที่มีลักษณะคล้ายกัน ข้อกำหนดเฉพาะสำหรับกระทะไฟฟ้าอเนกประสงค์เชิงพาณิชย์  
เฉพาะด้านความปลอดภัย ลงวันที่ 23 กันยายน พ.ศ.2542 และออกประกาศกำหนดมาตรฐาน  
ผลิตภัณฑ์อุตสาหกรรม ความปลอดภัยของเครื่องใช้ไฟฟ้าสำหรับใช้ในที่อยู่อาศัยและงานที่มีลักษณะคล้ายกัน  
ข้อกำหนดเฉพาะสำหรับกระทะไฟฟ้าอเนกประสงค์เชิงพาณิชย์ มาตรฐานเลขที่ มอก.1594-2553  
ขึ้นใหม่ ดังมีรายละเอียดต่อท้ายประกาศนี้

ทั้งนี้ให้มีผลตั้งแต่วันที่ถัดจากวันที่ประกาศในราชกิจจานุเบกษา เป็นต้นไป

ประกาศ ณ วันที่ 8 กันยายน พ.ศ. 2553

ชัยวุฒิ บรรณวัฒน์

รัฐมนตรีว่าการกระทรวงอุตสาหกรรม

# มาตรฐานผลิตภัณฑ์อุตสาหกรรม ความปลอดภัยของเครื่องใช้ไฟฟ้า สำหรับใช้ในที่อยู่อาศัยและงานที่มีลักษณะคล้ายกัน ข้อกำหนดเฉพาะสำหรับกระทะไฟฟ้า อเนกประสงค์เชิงพาณิชย์

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้กำหนดขึ้นโดยรับ IEC 60335-2-39(2008-06) Household and similar electrical appliances – Safety – Part 2-39: Particular requirements for commercial electric multi-purpose cooking pans มาใช้ในระดับเหมือนกันทุกประการ (identical) โดยใช้ IEC ฉบับภาษาอังกฤษเป็นหลัก

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ต้องใช้ร่วมกับมาตรฐานผลิตภัณฑ์อุตสาหกรรมความปลอดภัยของเครื่องใช้ไฟฟ้า สำหรับใช้ในที่อยู่อาศัยและเครื่องใช้ไฟฟ้าอื่นที่คล้ายกัน ข้อกำหนดทั่วไป มาตรฐานเลขที่ มอก.1375-2547

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้กำหนดคุณลักษณะที่ต้องการด้านความปลอดภัยของกระทะไฟฟ้าอเนกประสงค์เชิงพาณิชย์ซึ่งไม่ได้เจตนาให้ใช้งานในที่อยู่อาศัย มีแรงดันไฟฟ้าที่กำหนดไม่เกิน 250 โวลต์ สำหรับกระทะไฟฟ้า อเนกประสงค์เชิงพาณิชย์เฟสเดียวที่ต่อระหว่างเฟสกับนิวทรัล และไม่เกิน 480 โวลต์ สำหรับกระทะไฟฟ้าอเนกประสงค์เชิงพาณิชย์อื่น

**หมายเหตุ 101** ตัวอย่างเช่น กระทะไฟฟ้าที่ใช้ในภัตตาคาร ร้านอาหาร โรงพยาบาล และธุรกิจอาหาร เช่น ร้านเบเกอรี่ ร้านขายเนื้อ

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ครอบคลุมถึงส่วนที่ใช้ไฟฟ้าของกระทะไฟฟ้าอเนกประสงค์เชิงพาณิชย์ซึ่งใช้พลังงานรูปแบบอื่นได้ด้วย

ทราบเท่าที่เป็นไปได้ในทางปฏิบัติ มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้เกี่ยวข้องกับอันตรายทั่วไปที่เกิดจากกระทะไฟฟ้า อเนกประสงค์เชิงพาณิชย์

**หมายเหตุ 102** ข้อควรคำนึง

- กระทะไฟฟ้าอเนกประสงค์เชิงพาณิชย์ที่เจตนาให้ใช้งานในยานพาหนะ บนเรือ หรือบนเครื่องบิน อาจจำเป็นต้องมีข้อกำหนดเพิ่มเติม
- ข้อกำหนดเพิ่มเติมอาจจะระบุโดยกระทรวงสาธารณสุข กระทรวงแรงงาน การประปา และองค์กรที่คล้ายกัน

หมายเหตุ 103 มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ไม่ครอบคลุมถึง

- กระตะไฟฟ้าที่ออกแบบให้ใช้ในงานอุตสาหกรรมโดยเฉพาะ
- กระตะไฟฟ้าที่เจตนาให้ใช้งานในสถานที่ที่มีภาวะพิเศษ เช่น บรรยากาศที่อาจก่อให้เกิดการกัดกร่อนหรือการระเบิด (ฝุ่น ไอ หรือก๊าซ)
- กระตะไฟฟ้าที่ใช้ในกระบวนการต่อเนื่องสำหรับการผลิตอาหารปริมาณมาก
- กระตะไฟฟ้ากั้นลิก (IEC 60335-2-37)

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้กำหนดบทนิยาม ข้อกำหนดทั่วไป ภาวะทั่วไปสำหรับการทดสอบ การจำแนกประเภท การทำเครื่องหมายและฉลาก และข้อแนะนำ การป้องกันการเข้าถึงส่วนที่มีไฟฟ้า การเริ่มเดินเครื่องใช้ไฟฟ้าทำงานด้วยมอเตอร์ กำลังไฟฟ้าเข้าและกระแสไฟฟ้า การเกิดความร้อน กระแสไฟฟ้ารั่วและความทนทานไฟฟ้าที่อุณหภูมิทำงาน แรงดันไฟฟ้าเกินชั่วคราว ความต้านทานต่อความชื้น กระแสไฟฟ้ารั่วและความทนทานไฟฟ้า การป้องกันโหลดเกินของหม้อแปลงไฟฟ้าและวงจรไฟฟ้าที่เกี่ยวข้อง ความทนทาน การทำงานผิดปกติ เสถียรภาพและอันตรายทางกล ความแข็งแรงทางกล การสร้าง สายไฟฟ้าภายใน ส่วนประกอบ การต่อกับแหล่งจ่ายไฟฟ้าและสายอ่อนภายนอก ขั้วต่อสายสำหรับตัวนำภายนอก การเตรียมการสำหรับการต่อลงดิน หมุดเกลียวและจุดต่อระยะห่างในอากาศ ระยะห่างตามผิวฉนวน และฉนวนตัน ความทนความร้อนและไฟ ความต้านทานการเป็นสนิมและการแผ่รังสี ความเป็นพิษ และอันตรายที่คล้ายกัน รายละเอียดให้เป็นไปตาม IEC 60335-2-39(2008-06)

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เอกสารนี้เป็นสิทธิ์ของ IEC หากมิได้กำหนดไว้เป็นอย่างอื่นห้ามนำมาตรฐานฉบับนี้หรือ  
ส่วนหนึ่งส่วนใดไปทำซ้ำหรือใช้ประโยชน์ในรูปแบบ หรือโดยวิธีใด ๆ ไม่ว่าจะเป็นรูปแบบ  
อิเล็กทรอนิกส์หรือทางกล รวมถึงการถ่ายสำเนา ถ่ายไมโครฟิล์ม โดยไม่ได้รับอนุญาตเป็น  
ลายลักษณ์อักษรจาก IEC ตามที่อยู่ข้างล่างหรือจากสมาชิก IEC ในประเทศของผู้ร้องขอ

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

#### Part 2-39: Particular requirements for commercial electric multi-purpose cooking pans

#### 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 part of International Standard IEC 60335 has been prepared by IEC subcommittee 61E: Safety of electrical commercial catering equipment, of IEC technical committee 61: Safety of household and similar electrical appliances.

This consolidated version of IEC 60335-2-39 consists of the fifth edition (2002) [documents 61E/401/FDIS and 61E/413/RVD], its amendment 1 (2004) [documents 61E/436/FDIS and 61E/438/RVD] and its amendment 2 (2008) [documents 61E/616/FDIS and 61E/619/RVD].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 5.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

The French version of this standard has not been voted upon.

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 commercial electric multi-purpose cooking pans.

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 of Part 1 concerns an adjective, the adjective and the associated noun are also in bold.

The following differences exist in the countries indicated below.

- 6.1: Class 01 appliances are allowed (Japan).
- 6.2: For appliances intended to be installed in a kitchen, an appropriate degree of protection against harmful ingress of water is required according to their height of installation (France).
- 13.2: Leakage current limits are different (Japan).
- 16.2: Leakage current limits are different (Japan).
- Clause 21: For appliances intended to be installed in a kitchen, different values of impact energy are applicable according to the height of the impact point (France).

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication 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 may 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 the amendment 2 be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

## 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 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 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 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.

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 2-39: Particular requirements for commercial electric multi-purpose cooking pans

#### 1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electrically operated commercial **multi-purpose cooking pans** not intended for household use, their **rated voltage** being not more than 250 V for single-phase appliances connected between one phase and neutral and 480 V for other appliances.

NOTE 101 These appliances are used for example in restaurants, canteens, hospitals and commercial enterprises such as bakeries, butcheries, etc.

The electrical part of appliances making use of other forms of energy is also within the scope of this standard.

As far as is practicable, this standard deals with the common hazards presented by these types of appliances.

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, the national water supply authorities and similar authorities.

NOTE 103 This standard does not apply to

- appliances designed 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);
- continuous process appliances for the mass production of food;
- deep fat fryers (IEC 60335-2-37).

#### 2 Normative references

This clause of Part 1 is applicable.

#### 3 Definitions

This clause of Part 1 is applicable except as follows.

##### 3.1.4 Addition:

NOTE 101 The **rated power input** is the sum of the power inputs of all the individual elements in the appliance that can be on at one time; where there are several such combinations possible, that giving the highest power input is used in determining the **rated power input**.

### 3.1.9 *Replacement:*

#### **normal operation**

operation of the appliance under the following conditions

The appliance is operated in accordance with the manufacturer's instructions, with no load and with the controls set to give the temperatures as set out below, the temperature being measured at the geometrical centre of the inside of the bottom face.

Stepped controls are set to the first position that gives a temperature equal to or greater than 275 °C. Cycling controls are set so that the mean value of the temperature over the cycle is 275 °C ± 5 °C. If this temperature cannot be reached, the control is set at the maximum.

Motors incorporated in the appliance are operated in the intended manner under the most severe conditions that can be expected in normal use taking into account the manufacturer's instructions.

### 3.101

#### **multi-purpose cooking pan**

an appliance comprising a pan, the base of which is evenly heated and that is intended principally for cooking or preparing meats, sauces, etc. The pan may be fixed or tilting

NOTE 101 A **multi-purpose cooking pan** is also known as a “**bratt pan**”.

### 3.102

#### **installation wall**

a special fixed construction containing supply facilities for appliances installed in conjunction with it

## 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.

### 5.5 *Addition:*

*The tests are carried out with the pan in the position of normal use for cooking.*

### 5.10 *Addition:*

*Appliances intended for installation in a bank of other appliances and appliances intended to be fixed to an **installation wall** are enclosed to obtain protection against electric shock and harmful ingress of water equivalent to that obtained when installed in accordance with the instructions provided with the appliance.*

NOTE 101 Appropriate enclosures or additional appliances may be needed for test purposes.

**5.101** *Appliances are tested as **heating appliances**, even if they incorporate a motor.*

**5.102** *Appliances, when assembled in combination with or incorporating other appliances, are tested in accordance with the requirements of this standard. The other appliances are operated simultaneously in accordance with the requirements of the relevant standards.*

## 6 Classification

This clause of Part 1 is applicable except as follows.

### 6.1 Replacement:

Appliances shall be **class I** with respect to protection against electric shock.

*Compliance is checked by inspection and by the relevant tests.*

### 6.2 Addition:

Appliances normally used on a table shall be at least IPX3. Other appliances shall be at least IPX4.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Addition:

In addition, appliances shall be marked with

- the water pressure or range of pressures, in kilopascals (kPa), for appliances intended to be connected to a water supply, unless this is indicated in the instruction sheet;
- the rated capacity, in litres (l), unless this is indicated in the instruction sheet or marked on the appliance by another means, for example by a level mark.

### 7.6 Addition:



[symbol 5021 of IEC 60417-1]

equipotentiality

### 7.10 Addition:

Devices that control the tilting movement of tilting parts shall be clearly marked to show the direction of movement.

### 7.12 Addition:

The instructions shall warn the user not to use the appliance as a deep fat fryer unless it is intended to be used as one.

If symbol 5021 of IEC 60417-1 is marked on the appliance its meaning shall be explained.

### Modification:

The instruction concerning persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge is not applicable.

#### 7.12.1 *Replacement:*

The appliance shall be accompanied by instructions detailing any special precautions necessary for installation. For appliances intended for installation in a bank of other appliances and appliances intended to be fixed to an **installation wall**, details of how to ensure appropriate protection against electric shock and harmful ingress of water shall be supplied. If the controls of more than one appliance are combined in a separate enclosure, detailed installation instructions shall be supplied. Instructions for **user maintenance**, for example cleaning, shall also be given. They shall include a statement that the appliance is not to be cleaned with a water jet.

Appliances that are provided with an appliance inlet, and are intended to be immersed in water for cleaning shall be accompanied by an instruction stating that the connector shall be removed before the appliance is cleaned and that the appliance inlet shall be dried before the appliance is used again.

The instructions of appliances, other than **stationary** appliances and appliances with **detachable electrical parts**, that are not intended to be partially or completely immersed in water for cleaning, shall state that the appliance or part must not be immersed.

For appliances that are permanently connected to fixed wiring and for which leakage currents may exceed 10 mA, particularly if disconnected or not used for long periods, or during initial installation, the instructions shall give recommendations regarding the rating of **protective devices**, such as earth leakage relays, to be installed.

*Compliance is checked by inspection.*

#### 7.12.4 *Addition:*

The instructions for **built-in appliances** having a separate control panel for several appliances shall state that the control panel is only to be connected to the specified appliances in order to avoid a possible hazard.

#### 7.15 *Addition:*

When it is not practical to place the marking of **fixed appliances** so that it is visible after the appliance has been installed, the relevant information shall also be included in the instructions for use or on an additional label that can be fixed near the appliance after installation.

NOTE 101 An example of such a **fixed appliance** is a **built-in appliance**.

#### 7.101 Equipotential bonding terminals shall be marked with symbol 5021 of IEC 60417-1.

These markings shall not be placed on screws, removable washers or other parts that can be removed when conductors are being connected.

*Compliance is checked by inspection.*

**7.102** Appliances or the **detachable electrical parts** of appliances intended to be partially immersed in water for cleaning shall be marked with a line that clearly indicates the maximum depth of immersion, together with the substance of the following warning:

Do not immerse beyond this line.

If there is any seam or seal that causes the appliance or part not to withstand the treatment specified in 15.102, the line indicating the maximum depth of immersion shall be at least 50 mm below any such seam or seal when the appliance or the part is in the position in which it is to be cleaned.

*Compliance is checked by inspection and measurement.*

## 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 applicable except as follows.

**9.101** Fan motors providing a cooling effect in order to comply with the requirements of Clause 11 shall start under all voltage conditions that may occur in use.

*Compliance is checked by starting the motor three times at a voltage equal to 0,85 times **rated voltage**, the motor being at room temperature at the beginning of the test.*

*The motor is started each time under the conditions occurring at the beginning of **normal operation** or, for automatic appliances, at the beginning of the normal cycle of operation, the motor being allowed to come to rest between successive starts. For appliances provided with motors having other than centrifugal starting switches, this test is repeated at a voltage equal to 1,06 times **rated voltage**.*

*In all cases, the motor shall start and it shall function in such a way that safety is not affected and overload **protection devices** of the motor shall not operate.*

NOTE The supply source must be such that during the test the drop in voltage does not exceed 1 %.

## 10 Power input and current

This clause of Part 1 is applicable except as follows.

### 10.1 Addition:

NOTE 101 For appliances having more than one heating unit, the total power input may be determined by measuring the power input of each heating unit separately (see also 3.1.4).

## 11 Heating

This clause of Part 1 is applicable except as follows.

### 11.2 Addition:

*Appliances intended to be fixed to the floor and appliances with a mass greater than 40 kg and not provided with rollers, castors or similar means are installed in accordance with the manufacturer's instructions. If no instructions are given, these appliances are considered as appliances normally placed on the floor.*



#### 11.4 Replacement:

*Appliances are operated under **normal operation** such that the total power input of the appliance is 1,15 times **rated power input**. If it is not possible to switch on all heating elements at the same time, the test is made with each of the combinations that the switch arrangement will allow, the highest load possible with each switching arrangement being in circuit.*

*If the appliance is provided with a control that limits the total power input, the test is made with whichever combination of heating units, as may be selected by the control, imposes the most severe condition.*

*If the temperature rise limits of motors, transformers or **electronic circuits** are exceeded, the test is repeated with the appliance supplied at 1,06 times **rated voltage**. In this case only the temperature rises of motors, transformers or **electronic circuits** are measured.*

NOTE 101 See also 11.7.

#### 11.7 Replacement:

*Appliances are operated until steady conditions are established.*

NOTE 101 The duration of the test may consist of more than one cycle of operation.

*Agitator motors are operated continuously unless provided with a timer, in which case they are operated for the maximum time allowed by the timer, or until steady conditions are established, whichever is the shortest.*

*Tilting motors are operated immediately after the appliance has reached steady conditions, for one full cycle of operation (one cycle being from the fully up position, to the fully down position and back to the fully up position).*

*Lifting motors are similarly operated, but for three such cycles.*

## 12 Void

## 13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

#### 13.2 Modification:

Instead of the permissible leakage current for **stationary class I appliances**, the following applies:

- for cord and plug connected appliances      1 mA per kW **rated power input** of the appliance with a maximum of 10 mA
- for other appliances      1 mA per kW **rated power input** of the appliance with no maximum

## 14 Transient overvoltages

This clause of Part 1 is applicable.

## 15 Moisture resistance

This clause of Part 1 is applicable except as follows.

### 15.1 Addition:

*Appliances or any **detachable electrical parts** intended to be partially or completely immersed in water for cleaning are also subjected to the tests of 15.102.*

NOTE 101 Appliances other than **stationary appliances** or any **detachable electrical parts** not marked with a line indicating the maximum depth of immersion, or for which there is no warning against partial or complete immersion in the instruction sheet, are considered to be appliances intended to be completely immersed in water for cleaning.

#### 15.1.1 Addition:

*In addition, IPX0, IPX1, IPX2, IPX3 and IPX4 appliances are subjected for 5 min to the following splash test.*

*The apparatus shown in Figure 101 is used. During the test, the water pressure is so regulated that the water splashes up 150 mm above the bottom of the bowl. The bowl is placed on the floor for appliances normally used on the floor. For all other appliances, on a horizontal support 50 mm below the lowest edge of the appliance, the bowl is so moved around as to splash the appliance from all directions. Care is taken that the appliance is not hit by the direct jet.*

#### 15.1.2 Modification:

*Appliances normally used on a table are placed on a support having dimensions that are 15 cm ± 5 cm in excess of those of the orthogonal projection of the appliance on the support.*

### 15.2 Modification:

Instead of the requirements, the following applies.

Appliances shall be constructed so that spillage of liquid in normal use does not affect their electrical insulation.

#### Addition:

*Immediately after this test, appliances with tilting parts are subjected to the following test.*

*The pan, filled to its rated capacity or up to the level mark with cold water containing approximately 1 % NaCl, is then tilted to any position.*

### 15.3 Addition:

NOTE 101 If it is not possible to place the whole appliance in the humidity cabinet, parts containing electrical components are tested separately, taking into account the conditions that occur in the appliance.

**15.101** Appliances that are provided with a tap intended for filling or cleaning, shall be constructed so that the water from the tap cannot come into contact with live parts.

*Compliance is checked by the following test.*

*The tap is fully opened for 1 min with the appliance connected to a water supply having the maximum water pressure indicated by the manufacturer. Tilttable and movable parts, including lids, are tilted or placed in the most unfavourable positions. Swivelling outlets of water taps are so positioned as to direct water onto those parts that will give the most unfavourable result. Immediately following this treatment the appliance shall withstand an electric strength test as specified in 16.3.*

**15.102** Appliances or **detachable electrical parts** 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.*

*The sample is operated under **normal operation**, except that cycling controls, if any, are adjusted to the highest setting, the supply voltage being such that the power input of the appliance is 1,15 times the **rated power input**.*

*When steady conditions are established or when the cycling control operates for the first time, the connector is withdrawn or the supply switched off and the sample is immediately immersed completely in water having a temperature between 10 °C and 25 °C, unless it is marked with a line indicating the maximum depth of immersion, in which case it is immersed to the depth indicated.*

*After 1 h of immersion, the sample is removed from the water and dried, care being taken to ensure that all moisture is removed from the insulation in the vicinity of the pins of appliance inlets. The leakage current is then measured on the assembled appliance, as described in 16.2.*

*The leakage current shall not exceed the value specified in 16.2.*

*After the treatment described above and the measurement of the leakage current, the sample shall withstand an electric strength test as specified in 16.3, the test voltage being, however, reduced to 1 000 V.*

*The sample is then operated under **normal operation**, the supply voltage being such that the power input of the appliance is 1,15 times the **rated power input**, for 10 days (240 h). During this period, the sample is allowed to cool to approximately room temperature five times at regular intervals.*

*After this period, the connector of the sample is withdrawn or the supply otherwise switched off and the sample immediately immersed once more in water for 1 h as described above. It is then dried and the leakage current is measured again as described in 16.2.*

*The leakage current shall not exceed the value specified in 16.2.*

*The sample shall then withstand an electric strength test as specified before, and inspection shall show that water has not entered the appliance to any appreciable extent.*

NOTE When inspecting the appliance for the presence of water, special attention is paid to parts of the appliance in which electrical components are situated.

## **16 Leakage current and electric strength**

This clause of Part 1 is applicable except as follows.

## 16.2 Modification:

Instead of the permissible leakage current for **stationary class I appliances**, the following applies:

- for cord and plug connected appliances      1 mA per kW **rated power input** of the appliance with a maximum of 10 mA
- for other appliances      1 mA per kW **rated power input** of the appliance with no maximum

### Addition:

NOTE 101 For appliances intended to be used with a connector and intended to be partially or completely immersed in water for cleaning, the appliance inlet may be dried, for example by means of blotting paper, before applying the test voltage, if the appliance would not otherwise withstand this test.

## 17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

## 18 Endurance

This clause of Part 1 is applicable.

## 19 Abnormal operation

This clause of Part 1 is applicable except as follows.

### 19.1 Addition:

*A control or switching device that is intended for different settings corresponding to different functions of the same part of the appliance and that are covered by different standards is, in addition, set in the most severe setting irrespective of the manufacturer's instructions.*

### 19.2 Addition:

*Controls are set at maximum.*

### 19.4 Addition:

NOTE 101 The main contacts of the contactor intended for switching on and off the heating element(s) in normal use are locked in the "ON" position. However, if two contactors operate independently of each other or if one contactor operates two independent sets of main contacts, these contacts are locked in the "ON" position in turn.

## 20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

### 20.2 Modification:

Add the following after the first requirement paragraph.

This applies also to parts necessary to effect the tilting operation, i.e. handles or wheels.

## 21 Mechanical strength

This clause of Part 1 is applicable.

## 22 Construction

This clause of Part 1 is applicable except as follows.

### 22.13 Addition:

Lids and their grips shall be constructed so that when opening and closing them scalding by steam is obviated.

**22.101** For three-phase appliances, **thermal cut-outs** protecting circuits with heating elements, and those for motors of which the unexpected starting may cause a hazard, shall be of the non-self-resetting and trip-free type, and shall provide **all-pole disconnection** from related supply circuits.

For single-phase appliances and for single-phase heating elements and/or motors connected between one phase and neutral or between phase and phase, **thermal cut-outs** protecting circuits with heating elements, and those for motors of which the unexpected starting may cause a hazard, shall be of the non-self-resetting and trip-free type, and shall provide at least one-pole disconnection.

If the **non-self-resetting thermal cut-out** is only accessible after removing parts with the aid of a **tool**, the trip-free type is not required.

NOTE 1 **Thermal cut-outs** of the trip-free type have an automatic action, with a reset actuating member, so constructed that the automatic action is independent of manipulation or position of the reset mechanism.

**Thermal cut-outs** of the bulb and capillary type that operate during the tests of Clause 19 shall be such that rupture of the capillary tube shall not impair compliance with the requirements of 19.13.

*Compliance is checked by inspection, by manual test and by rupturing the capillary tube.*

NOTE 2 Care must be taken to ensure that the rupture does not seal the capillary tube.

**22.102** Lights, switches or push-buttons shall only be coloured red for the indication of danger, alarm or similar situations.

*Compliance is checked by inspection.*

**22.103** Appliances shall be constructed so that spillage or splashing of hot oil on parts that in normal use have a temperature exceeding 300 °C is adequately prevented.

*Compliance is checked by inspection after the test of 15.2.*

**22.104** Appliances with tilting pans shall be provided with a mechanism that prevents accidental tilting from any position.

If the pan is tilted by means of an electric motor, it shall only be possible for this motor to function if the pressure is maintained on the control buttons or switches. The buttons or switches shall be located and protected in such a way that they cannot be operated accidentally.

If the pan is tilted manually, it shall not be possible to adversely influence the tilting action other than by the intended means.

*Compliance is checked by inspection and by applying a force of 340 N at any point to the pan.*

**22.105** Appliances with tilting pans shall be constructed so that if the pan is tilted through an angle of more than 12° with respect to the horizontal, the heating elements shall automatically be switched off.

*Compliance is checked by inspection and measurement.*

**22.106** Hinged lids shall be protected against accidental falling.

*Compliance is checked by inspection and by manual test.*

**22.107 Portable appliances** shall not have openings on the underside that would allow small items to penetrate and touch **live parts**.

*Compliance is checked by inspection and by measuring the distance between the supporting surface and **live parts** through openings. This distance shall be at least 6 mm. However, if the appliance is fitted with legs, this distance is increased to 10 mm if the appliance is intended to stand on the table and to 20 mm if it is intended to stand on the floor.*

**22.108** The rim of tilting pans shall be constructed so that the liquid is poured out in an even stream.

*Compliance is checked by manual test.*

## 23 Internal wiring

This clause of Part 1 is applicable except as follows.

### 23.3 Addition:

*When the capillary tube of the **thermostat** is liable to flexing in normal use the following applies:*

- *where the capillary tube is fitted as part of the internal wiring, Part 1 applies;*
- *where the capillary tube is separate, it is subjected to 1 000 flexings at a rate not exceeding 30 per min.*

NOTE 101 If, in any of the above cases, it is not possible to move the movable part of the appliance at the given rate, due for example to the mass of the part, the rate of flexing may be reduced.

*After the test, the capillary tube shall show no sign of damage within the meaning of this standard and no damage impairing its further use. However, if a rupture of the capillary tube renders the appliance inoperative (fail-safe), separate capillary tubes are not tested, and those fitted as part of the internal wiring are not inspected for compliance with the requirements.*

*Compliance in this instance is checked by rupturing the capillary tube.*

NOTE 102 Care must be taken to ensure that the rupture does not seal the capillary tube.

## 24 Components

This clause of Part 1 is applicable except as follows.

**24.101** Connectors fitted to appliances shall not incorporate a **thermostat**.

*Compliance is checked by inspection.*

## 25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

### 25.3 Addition:

**Fixed appliances** and appliances with a mass greater than 40 kg and not provided with rollers, castors or similar means shall be constructed so that the **supply cord** can be connected after the appliance has been installed in accordance with the manufacturer's instructions.

Terminals for permanent connection of cables to fixed wiring may also be suitable for the **type X attachment** of a **supply cord**. In this case a cord anchorage complying with 25.16 shall be fitted to the appliance.

If the appliance is provided with a set of terminals allowing the connection of a flexible cord, they shall be suitable for the **type X attachment** of the cord.

In both cases the instructions shall give full particulars of the power **supply cord**.

The connection to the supply wires of **built-in appliances** may be made before the appliance is installed.

*Compliance is checked by inspection.*

### 25.7 Modification:

Instead of the types of **supply cords** specified, the following applies.

**Supply cords** shall be oil-resistant, sheathed flexible cable not lighter than ordinary polychloroprene or other equivalent synthetic elastomer-sheathed cord (code designation 60245-IEC-57).

## 26 Terminals for external conductors

This clause of Part 1 is applicable.

## 27 Provision for earthing

This clause of Part 1 is applicable except as follows.

**27.2 Addition:**

**Stationary appliances** shall be provided with a terminal for the connection of an external equipotential conductor. This terminal shall be in effective electrical contact with all fixed exposed metal parts of the appliance, and shall allow the connection of a conductor having a nominal cross-sectional area of up to 10 mm<sup>2</sup>. It shall be located in a position convenient for the connection of the bonding conductor after installation of the appliance.

NOTE 101 Small fixed exposed metal parts, for example nameplates and the like, are not required to be in electrical contact with the terminal.

**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 and the insulation shall have a comparative tracking index (CTI) not less than 250, 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.

**30.2.1 Modification:**

*The glow-wire test is carried out at 650 °C.*

**30.2.2** Not applicable.

**30.101** *Filters, if any, of non-metallic materials intended for the absorption of grease are subjected to the burning test specified in ISO 9772 for category HBF material, if relevant, or shall be classified at least HB40 according to IEC 60695-11-10, except that the thickness of the specimen is the same as that in the appliance.*

NOTE It may be necessary to support the specimen.

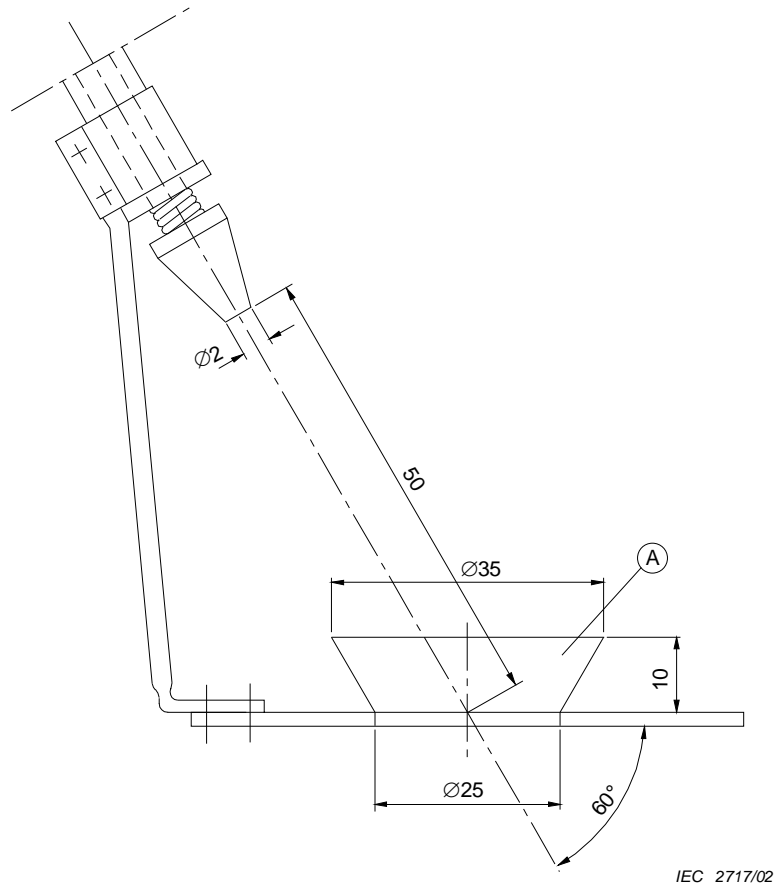
**31 Resistance to rusting**

This clause of Part 1 is applicable.

**32 Radiation, toxicity and similar hazards**

This clause of Part 1 is applicable.





*Dimensions in millimetres*

**Key**

A Bowl

**Figure 101 – Splash apparatus**

## Annexes

The annexes of Part 1 are applicable except as follows.

### Annex N (normative)

#### Proof tracking test

##### 6.3 Addition:

*Add 250 V to the list of specified voltages.*

## 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*

ISO 13732-1, *Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part 1: Hot surfaces*

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