



BSI Standards Publication

## Household and similar electrical appliances — Safety

Particular requirements for devices for fire prevention and suppression for electric hobs (cooktops)

**National foreword**

This British Standard is the UK implementation of EN 50615:2015.

The UK participation in its preparation was entrusted to Technical Committee CPL/61/7, Safety of electrical appliances - Heated appliance group.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

## Household and similar electrical appliances - Safety - Particular requirements for devices for fire prevention and suppression for electric hobs (cooktops)

Essais sur les dispositifs de prévention et d'extinction du feu pour les plaques de cuisson (tables de cuisson)

Prüfungen für Vorrichtungen zur Feuervermeidung und Feuerlöschung auf Kochmulden

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## Foreword

This document (EN 50615:2015) has been prepared by CLC/TC 61 "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-01-05
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2018-01-05

This document is intended to be used in conjunction with EN 60335-1:2012 and its amendments.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

## Introduction

This European Standard has been prepared to provide a means of conforming to essential safety requirements of the Low Voltage Directive 2006/95/EC. Other requirements and other EU Directives may be applicable to the devices within the scope of this standard.

This European Standard is a product family standard dealing with the safety of devices for fire prevention and suppression for hobs (cooktops).

This European Standard recognizes the level of protection against fire hazards of stationary cooking ranges, hobs and similar appliances.

A device for fire prevention and suppression for hobs (cooktops) 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.

This European Standard takes into account the requirements of the HD 384 Series as far as possible so that there is compatibility with the wiring rules when the device is connected to the supply mains. However, national wiring rules may differ.

This European Standard applies in conjunction with EN 60335-1:2012 and its amendments, which is referred to in this text as "Part 1". This European Standard supplements or modifies the corresponding clauses of Part 1 as indicated in the text.

Although from evidences available the main cause of problems is fire, also production of dangerous amount of smoke or just smoke, that contains dangerous substances, was considered, but during the development of the standard it was not possible to develop a reproducible test for such detection. This subject is therefore under consideration.

## 1 Scope

*The first sentence in the Scope of EN 60335-1 is replaced by:*

This European standard deals with the safety of electric devices used for detection, prevention and suppression of fire originated:

- from a cooking process, or
- from flammable material left on the hob.

NOTE The provisions of this document, duly adapted to the specific installation and conditions of use, may be taken into consideration as guidance also for the protection from fire originated from the use of portable cooking appliances or from grills in the oven cavity.

The devices covered by this European Standard may operate by interaction with, or integration of, other devices such as smoke detectors, fire detectors, motion detectors, CO detectors and fire extinguishers that are covered by their specific applicable standards.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 54-3:2001, *Fire detection and fire alarm systems — Part 3: Fire alarm devices — Sounders*

EN 60335-1:2012, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2010, modified)*

EN 60335-2-6:2003, *Household and similar electrical appliances — Safety — Part 2-6: Particular requirements for stationary cooking ranges, hobs, ovens and similar appliances (IEC 60335-2-6:2000, modified)*

EN 60335-2-31:2003, *Household and similar electrical appliances — Safety — Part 2-31: Particular requirements for range hoods and other cooking fume extractors (IEC 60335-2-31:2002)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 60335-1:2012, EN 60335-2-6:2003 and the following apply.

### 3.1.9 Replacement

The appliance is connected to the supply mains and operated as in normal use. Vessels, without lids, containing water are placed on each **hob element**. The diameter of the vessel is approximately equal to that of the **hob element**. **Hob elements** are operated to maintain simmering.

### 3.101 Categories of fire protection devices

#### 3.101.1 Category A



Device for extinguishing and simultaneous power cut-off of the appliance.

### **3.101.2 Category B**

Device for preventive power cut-off of the appliance.

### **3.101.3 Category AB**

Device for preventive power cut-off of the appliance, followed by extinguishing, if flame occurs.

## **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.

### *Addition:*

The tests shall be carried out in a test room having a volume between 20 m<sup>3</sup> and 30 m<sup>3</sup>.

For the tests of 11.104.1 and 11.104.2, devices that only depend on ambient temperature for their operation shall be tested at an ambient temperature of 40<sup>+0</sup><sub>-5</sub> °C.

Verification of the type of operation shall be done by examination of the technical documentation delivered by the manufacturer.

## **6 Classification**

This clause of part 1 is applicable except as follows:

**6.101** With reference to the type of intervention the devices shall be of one of the following categories: **Category A, Category B, Category AB**

Compliance is checked by inspection and by the relevant tests.

## **7 Marking and instructions**

This clause of Part 1 is applicable except as follows.

### **7.1** *Addition:*

Devices shall be marked with the reference to their category.

### **7.12** *Addition:*

Instructions shall give information to the user with regard to the meaning/function of the marked category.

In case the device is suitable only for given types of cooking appliances or for hobs with a maximum width this shall be stated in the instructions.

Devices for fire prevention, detection and suppression will not detect all possible hazards due to different cooking habits.

Whenever relevant, the details on the interval for technical check and maintenance done by the manufacturer of the device or his authorized representatives shall be stated.

Specific instructions for user maintenance (e.g. cleaning of the detection device, periodical verification of functionality, etc.) shall be given.

For **Category B** devices: this device may not be suitable for fires originating from flammable materials left in proximity of the hob or on the hob

For **Category A** devices: this device is not suitable to control fires originating in an oven or in an oven grill.

#### **7.12.1** *Addition:*

Instructions shall state the specific installation conditions and, if relevant, the limitations of use (e.g. in case when no range hood is foreseen in the installation or in case of cooking appliances not installed against the walls of the kitchen or the reference to the specific products for which the device is designed).

## **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*

Compliance is checked with the tests in 11.104.

### **11.2** *Addition:*

The devices shall be installed according to the instructions given by the manufacturer.

If the instruction manual provides multiple ways or positions for installation of the device(s) the device(s) shall be installed in the most unfavourable position.

Based on the specific instructions given by the manufacturer, a hob having six hob elements as defined in EN 60335-2-31:2003, 11.2, is installed in a base cabinet having the following dimensions:

Width:  $119,8 \pm 2$  cm, Depth:  $60,0 \pm 2$  cm, Height:  $86,0 \pm 2$  cm. One cabinet with dimensions Width:  $59,8 \pm 2$  cm, Depth:  $60,0 \pm 2$  cm, Height:  $86,0 \pm 2$  cm is installed on both sides of the base cabinet supporting the hob.

In case the manufacturer limits the use of the device to a hob having four elements, the hob as defined in EN 60335-2-31:2003, 11.2, is installed in a base cabinet having the following dimensions Width:  $59,8 \pm 2$  cm, Depth:  $60,0 \pm 2$  cm, Height:  $86,0 \pm 2$  cm

If the instructions for use foresee the use of a range hood, a cabinet with dimensions Width:  $59,8 \pm 2$  cm, Depth:  $37,0 \pm 2$  cm, Height:  $70,0 \pm 2$  cm is installed on both sides of the range hood.

If the device is foreseen to be installed with hobs with less than 4 or more than 6 hob elements, the hob indicated by the manufacturer of the device shall be used, choosing the one giving the most unfavourable results.

The tests can also be performed with the suitable hobs specified in the instructions by the manufacturer choosing the one giving the most unfavourable results. If no specification is available in the instructions, then the hobs required by EN 60335-2-31 shall be used.

If devices of **Category A**, or **Category B** or **Category AB** are integrated in the range hood or in the hob, the range hood or the hob are subjected to the tests as delivered.

In case of devices foreseen to be integrated or mounted on a specific model of range hood, the range hood foreseen by the manufacturer of the device is installed in a cabinet having suitable dimensions.

The test shall be carried out with the range hood operating on both conditions: switched-off and switched on at maximum air flow.

The bottom level of the cabinets shall be at  $55 \pm 2$  cm from the top of the base cabinet supporting the hob.

A typical installation for a 4 hob elements is given in Figure 101



**Figure 101**

*Addition*

*During this test there shall be no activation of the alarm.*

*Add the following new sub clauses:*

### **11.101 Verification of correct operation of devices for fire detection and suppression**

The device shall take measures to ensure that, as a result of unattended operation or excessive temperature, fires caused by the cooking process are avoided.

For category A and AB devices, in addition, the risk of dangerous fire caused by materials (newspapers, paper, towels, etc.) left on the hob shall be avoided.

Compliance is checked by the tests in 11.104.

### **11.102 Preconditioning of the device**

Whenever the instructions for use require a pre-conditioning of the device, the device shall be conditioned according to the instructions before starting the test.

If the sensor's sensitivity is adjustable, it shall not be possible for the user to adjust it unintentionally.

The sensitivity adjustment shall require a specific procedure or user interface operation which is clearly different from the normal operation of the system. Also, the permanent sensitivity level should not change automatically.

### **11.103 Cooking tools**

Pans to be used for the tests are those defined in EN 60335-2-6:2003, 3.1.9.101.

### **11.104 Testing requirements**

The tests are grouped into category A tests (for **Category A** devices) and category B tests (for **Category B** devices).

**Category AB** devices shall be subjected to both test programmes.

For the execution of the tests the following conditions shall be applied:

- 1) Lids shall not be used on any pans during tests.
- 2) The oil to be used in the test shall be sunflower oil and it shall be renewed with fresh one for each test.
- 3) Ensure that temperature on hob is at room temperature before starting a test.
- 4) The tests shall be carried out with the hob elements operating at maximum input.
- 5) Before starting each of the test sequences in rows 1, 2, 3, 4 and 5 and if the construction allows so, the device shall be fully disconnected from the supply (e.g. by removing the batteries) for at least 15 s.

11.104.1 Tests for category A devices

	W	X	Y
	Preparation	Test	Test criteria / measurement
Test 1 - Test device for false alarms (discharge of extinguishing agent without danger of fire).	Place pans (as in figure 101 of EN 60335-2-6) on all plates. Size of pans should equal size of plates. Fill all pans, except the largest one, with water (according to table 101 of part 60335-2-6). Fill largest pan with a quantity of sunflower oil as in table 11.Z105 .	Heat all pans with water until water is boiling. Keep water simmering during the whole test. After all pans with water have been simmering for 20 minutes, start heating the largest pan (with sunflower oil) on full power with the aim to create fire	The device shall not cut off power to the cooktop or activate the extinguishing agent before the oil temperature reaches 200 °C, but it shall cut the power to the cooktop within 30 sec from the ignition and shall extinguish the fire within 45 seconds from the ignition
Test 2 - Determining which plates are easiest and hardest to extinguish fire on.  <i>The worst plate is determined by measuring the minimum amount of extinguishing agent relevant to pan dimension.</i>	Place pans (as in table 101 of 2-6) on all plates. Size of pans should equal size of plates.	Manually discharge the extinguishing agent from the device.	Measure amount of extinguishing agent in each of the pans. Easiest and hardest plate to extinguish fire on is determined by amount of extinguishing agent in pan relative to pan dimensions. If same diameter pans is used the volume is used to determine best and worst.
Test 3 - Test device on the plates with best and worst result from test 2 (the plates that are easiest and hardest to extinguish fire on).	Place pan (as in figure 101 of EN 60335-2-6 and with dimension suitable to fit relevant plate) on the plate that is to be tested. Fill pan with a quantity of sunflower oil as in table 11.Z105. Place pans fitting to the diameter of the plates with a height of 15cm ± 2cm on all other plates. Test the two plates with best and worst result during test 2, one at a time.	Set full effect on plate that is under testing to create a fire.	The device should cut off power within 30 sec from the ignition and shall extinguish fire within 45 seconds from the ignition.
Test 4 - Test device on at least 50% of plates simultaneously.	Place pans (as in figure 101 of EN 60335-2-6) on at least 50% of the plates. Size of pans should equal size of plates. The plate with worst result in test 2 shall be part of the plates tested. Fill with the amount of sunflower oil described in table 101 of EN 60335-2-6.	Set full effect on the plates being tested with the aim to create fire.	The device should cut off power within 30 sec from the ignition and shall extinguish fire within 45 seconds from the ignition.
Test 5 - Test device on the plate with worst result in test 2 without pan and with commercially available kitchen full roll paper put at the center of the plate	Place a commercially available kitchen full roll paper (length 23 ± 1 cm, diameter 11 ± 1cm) horizontally on the plate with worst result from test 1.	Set full effect on plate that is under testing to create a fire.	The device should cut off power within 30 sec from the ignition and shall extinguish fire within 45 seconds from the ignition.

- For **Category A** and **Category AB** it shall be verified by visual inspection that no hazardous splashing occurs when the extinguishing agent is spread over the cooktop
- When testing **Category AB** devices on the category A it is necessary to deactivate the preventive power cut-off function.

#### 11.104.2 Tests for Category B devices

		W	X	Y
		Preparation	Test	Test criteria / measurement
1	Test 1 - Test device for false alarms	Place pans (as in figure 101 of EN 60335-2-6) on all plates. Size of pans should equal size of plates. Fill all pans, except the largest one, with water (according to table 101 of part 60335-2-6). Fill largest pan with a quantity of sunflower oil as in table 11.Z105.	Heat all pans with water until water is boiling. Keep water simmering during the whole test. After all pans with water have been simmering for 20 minutes, start heating the largest pan (with sunflower oil) on full power with the aim to create fire	The device shall not cut off power to the cooktop or activate the extinguishing agent before the sunflower oil temperature reaches 200 °C, but it shall cut the power before the sunflower oil temperature reaches 330 °C.
2	Test 2 - Test device on all plates, one by one.	Place pan (as in table 101 of EN 60335-2-6 and with dimension suitable to fit relevant plate) on the plate that is to be tested. Fill pan with a quantity of sunflower oil as in table 11.Z105. Place pans fitting to the diameter of the plates with a height of 15cm ± 2cm on all other plates. All plates should be tested, one at a time.	Set full effect on plate that is under testing with the aim to create a fire.	The device should cut off power to the cooktop before the sunflower oil temperature reaches 330°C (before fire starts). The sunflower oil shall not ignite within 10 minutes after the power to the cooktop has been cut.
3	Test 3 - Test device with cast iron pan (frying pan) on the plate with worst result during test 2.	Place cast iron pan with dimension suitable to fit relevant plate on the plate that is to be tested. Fill pan with a quantity of sunflower oil as in table 11.Z105. Place tall empty pans with a height of 15cm ± 2cm on all other plates.	Set full effect on plate that is under testing with the aim to create a fire.	The device should cut off power to the cooktop before the sunflower oil temperature reaches 330°C (before fire starts). The sunflower oil shall not ignite within 10 minutes after the power to the cooktop has been cut.

**Table 11.105 – Quantity of sunflower oil for the tests**

Diameter of standard pot (mm)	Quantity of sunflower oil (ml)
110	30
145	50
180	80
220	120
300	220

*Compliance is checked by the following:*

#### **Category A devices**

**Category A** devices shall be activated after a maximum time of 30 s after ignition, shall disconnect the appliance from the supply and shall give an audible warning of at least 65 dB sound pressure measured 1 m distance in accordance with EN 54-3 for maximum 15 s. After a maximum time of 45 s after ignition the flame shall be extinguished.

NOTE This gives the user the chance to get the fire under control for example in case of flambéing, etc.

*It shall be verified that no re-ignition takes place within a period of 10 min after extinguishment.*

#### **Category B devices**

**Category B** devices shall switch-off the appliance before the flames start and an audible warning of at least 65 dB measured 1 m distance in accordance with EN 54-3 shall be generated until the user stops the alarm, for example by pressing a button, or the temperature of the oil starts to decline.

#### **Category AB devices**

**Category AB** devices shall disconnect the appliance from the supply before the flame starts and shall give an audible warning of at least 65 dB sound pressure measured 1 m distance in accordance with EN 54-3 for a maximum of 15 s.

**Category AB** devices shall comply with the requirements for **Category B** devices. If there is an ignition, then the device shall react as defined for **Category A** devices

*It shall be verified that no ignition takes place within a period of 10 minutes after activation of the device.*

#### **For devices of all categories**

*Devices may be provided with a feature allowing to set up the device to operate silently.*

*After activation, the system shall not be self-resetting.*

*The appliance shall only be restarted after intervention of the user or of the manufacturer.*

## **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.

## **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 applicable.

## **19 Abnormal operation**

This clause of Part 1 is applicable except as follows:

*Sub-clauses 19.2 to 19.10 are not applicable.*

## **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.*

**22.46** *Replace the last sentence of the requirements with the following:*

Software used in the meaning of this standard shall be also evaluated for functional safety.

*Add the following new sub clauses*

### **22.102 Supply of the devices**

All devices that are only battery supplied shall give a visible and audible warning signal when the battery is approaching the end of life or in case that they are wrongly mounted. In this situation the cooking appliance cannot be switched on. However, in each case that the user wants to start a cooking process, the error message needs to be confirmed by the user and the appliance is unlocked again.

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

### **22.103 Temporary deactivation**

The device may be provided with a way to deactivate (e.g. with a component having only one rest position or a temporary contact switch) to be used in cases when the user wants to control a specific cooking process or in case of false alarms, caused by a specific cooking process.

In case the deactivation function is used it shall last for a maximum of 5 min.

Deactivated mode shall be indicated by a signal (light and/or sound).

If a deactivation function is present, the instructions on the correct way to operate it shall be given in 7.12.

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

### **22.104 Test system**

The device shall be provided with an automatic system or a specific test button or similar device to verify that all components, if any, are suitably connected and the devices are correctly functioning.

If the test button is activated, the disconnecting device shall also cut-off the hob.

In case of non-correct connection or non-correct operation, the device shall give a visible or audible warning.

*Compliance is checked by inspection and by analysis of the documentation submitted by the manufacturer.*

### **22.105 Disconnecting device**

A disconnecting device shall be provided together with the detecting device. The disconnecting device shall comply with the relevant applicable standard.

In case when a disconnection device is not provided together with the detecting device, the characteristic of the disconnecting device to be used shall be stated in the instructions for use.

The disconnecting device shall operate depending on the intervention of the detecting device and on its characteristics (**Category A** or **Category B** or **Category AB**)

*Compliance is checked by inspection.*

NOTE Attention is drawn on the fact that in some countries suppressing devices (**Category A** or **Category AB**) need to be provided with a backup battery.

### **22.106 Means to keep the device in place**

The detecting device shall be held in place with reliable means, such that the device cannot be easily detached.

After removal for maintenance or cleaning, the fixing means shall be such that the device can only be remounted in the original position.

If the device or an important part of the device (for example the sensor) is removed from its original position or orientation for more than 5 min, the power to the cooktop must be cut off until the removed part has been replaced correctly.

*Compliance is checked by inspection.*

## **23 Internal wiring**

This clause of Part 1 is applicable.

## **24 Components**

This clause of Part 1 is applicable except as follows.

*Addition*

### **24.101**

Devices designed to be mounted in a zone consisting of the hob surface that extends 100 cm from all the edges of the hob and a height of 70 cm above the area shall comply with pollution degree 3, unless the insulation is enclosed so that it is unlikely to be exposed to pollution during normal use of the device. *Compliance is checked by inspection and by the tests specified in the relevant standard.*

## **25 Supply connection and external flexible cords**

This clause of Part 1 is 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.

## **30 Resistance to heat and fire**

This clause of Part 1 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**

#### ***Addition:***

EN 60730-1:2011, *Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1:2010, modified)*

EN 60730-2-9:2010, *Automatic electrical controls for household and similar use — Part 2-9: Particular requirements for temperature sensing controls (IEC 60730-2-9:2008, modified)*

EN 61591, *Household range hoods and other cooking fume extractors — Methods for measuring performance (IEC 61591)*

ISO 15371:2009, *Ships and marine technology — Fire extinguishing systems for protection of galley cooking equipment*



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