

In the event of any doubt or misunderstanding arising from this translation, the standard in Thai will be held to be authoritative.

Unofficial Translation  
**TIS 1509 -2547 (2004)**  
**Thai Industrial Standard**  
**for**  
**Electric fryers : Safety requirements**

### 1.Scope

This standard specifies the safety of deep fat fryers, frying pans and other similar appliances, intended for household use only, their **rated voltage** being not more than 250 V, which will be referred to as "electric fryer".

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

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

- the use of electric fryers by young children or infirm persons without supervision;
- playing with the electric fryer by young children.

**NOTE 101** *Attention is drawn to the fact that*

- *for electric fryers 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 for commercial use (IEC 60335-2-37);*
- *commercial multi-purpose cooking pans (IEC 60335-2-39);*

- *electric fryers intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).*
- *electric fryers for high-frequency heating*

## **2. Normative references**

This clause of Safety of household electrical appliance : General requirements TIS 1375 clause 2. is applicable.

## **3. Definitions**

This clause of TIS 1375 clause 3. is applicable except as follows.

### **3.1.9 Replacement:**

#### **normal operation**

Operation of the electric fryers under the following conditions

Deep fat fryers are operated filled with sunflower oil to the minimum oil level marked on the electric fryers.

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 electric fryer does not have a **thermostat**, the temperature is maintained by switching the supply on and off.

### **3.101 Electric fryers**

Appliances which use electrical energy to produce heat, the heating elements may be incorporated in the electric fryer or is designed as a particular stand separated from the electric fryers.

### **3.102 Deep fat fryers**

Electric fryers having the oil container marked with minimum and maximum oil level. Maximum oil quantity dose not exceed 5 l.

### **3.103 Frying pans**

Other electric fryers except deep fat fryers.

#### **4. General requirement**

This clause of TIS 1375 clause 4. is applicable.

#### **5. General conditions for the tests**

This clause of TIS 1375 clause 5. 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 TIS 1375 clause 6. is applicable except as follows.

##### **6.1 Replacements :**

Electric fryers shall be one of the following classes with respect to protection against electric shock.

- class 0I
- class I
- class II

Compliance is checked by inspection and relevant tests.

#### **7. Marking and instructions**

This clause of TIS 1375 clause 7. 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.

Electric fryers 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 electric fryer 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 electric fryer is cleaned and that the appliance inlet must be dried before the electric fryer 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 electric fryer 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 electric fryers 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 TIS 1375 clause 8. is applicable.

### **9. Starting of motor-operated appliances**

This clause of TIS 1375 clause 9. is not applicable.

### **10. Power input and current**

This clause of TIS 1375 clause 10. is applicable.

### **11. Heating**

This clause of TIS 1375 clause 11. is applicable except as follows.

**11.2** *Modification:*

**Portable electric fryers** 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:*

Electric fryers 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 TIS 1375 clause 13. is applicable.

### **14. Transient overvoltages**

This clause of TIS 1375 clause 14. is applicable.

## 15. Moisture resistance

This clause of TIS 1375 clause 15. is applicable except as follows.

### *15.101 Addition:*

Electric fryers 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 electric fryers.

The electric fryers are operated under **normal operation** at 1,15 times **rated power input**, until the **thermostat** operates for the first time. Electric fryers without a **thermostat** are operated until, steady conditions are established. The electric fryers are disconnected from the supply, any electric fryers 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 electric fryers 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 electric fryers shall withstand the electric strength test of 16.3, the voltage being as specified in Table 4.

The electric fryers 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 sample are operated under **normal operation** at 1,15 times **rated power input** for 240 h. After this period, the electric fryers 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 TIS 1375 clause 16. is applicable.

### **17. Overload protection of transformers and associated circuits**

This clause of TIS 1375 clause 17. is applicable.

### **18. Endurance**

This clause of TIS 1375 clause 18. is not applicable.

### **19. Abnormal operation**

This clause of TIS 1375 clause 19. 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 electric fryer 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 electric fryer 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 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 TIS 1375 clause 20. is applicable.

## **21. Mechanical strength**

This clause of TIS 1375 clause 21. is applicable..

## **22. Construction**

This clause of TIS 1375 clause 22. 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 TIS 1375 clause 23. is applicable.

### **24. Components**

This clause of TIS 1375 clause 24. 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 electric fryers 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 TIS 1375 clause 25. is applicable except as follows.

**25.1** *Addition:*

Electric fryers 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 TIS 1375 clause 26. is applicable.

## **27. Provision for earthing**

This clause of TIS 1375 clause 27. is applicable.

## **28. Screws and connections**

This clause of TIS 1375 clause 28. is applicable.

## **29. Clearances, creepage distances and solid insulation**

This clause of TIS 1375 clause 29. 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 electric fryer.

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

This clause of TIS 1375 clause 30. 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 TIS 1375 clause 31. is applicable.

### **32. Radiation, toxicity and similar hazards**

This clause of TIS 1375 clause 32. is applicable.

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