

Unofficial Translation
TIS 1389-2539 (1996)
Thai Industrial Standard
for
Tumbler dryers : Safety requirement

1.Scope

- 1.1 This standard specifies classification, requirement, marking and labelling, sampling and criteria for conformity and test for tumbler dryers for household and similar purposes including the drying function appliances having both a washing and drying function, the rated voltage being not more than 250 V for single-phase a.c. supply at the frequency of 50 Hz.
- 1.2 This standard deals with the safety requirement for tumbler dryers.
- 1.3 This standard does not cover tumbler dryers designed for industrial or commercial purposes, or intended to be used in special locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas) or used in locations where young children or infirm persons without supervision, additional requirements may be necessary.

2. Definition

The meaning of terminology in this standard shall be in accordance with TIS 1375 Part 1, and the followings:

- 2.1 Tumbler dryers: An appliance in which textile material is dried by tumbling in a rotating drum through which heated air is blown.
- 2.2 Normal operation: The tumbler dryer is operated with the drum filled with textile material having a mass in the dry condition equal to the maximum load stated in the instructions for use.

The textile material consists of pre-washed double-hemmed cotton sheets approximately 70 cm X 70 cm having a mass between 140 g/m² and 175 g/m² in the dry condition. The textile material is soaked with water having a temperature of 25°C ± 5°C and a mass equal to that of the textile material.

If the drying function can automatically follow the washing function in a washing machine, the drum is not separately loaded. The tumbler dryer is operated with the maximum quality of textile material stated in the instructions for use for the combined washing-drying cycle.

Notes: 1. *Cotton having a water content not exceeding 10% is considered a being in the dry condition.*

2. *Cotton conditioned for 24 h in still air having a temperature of $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$, a relative humidity between 60% and 70% and a pressure between 86 to 106 MPa, will contain approximately 7% of water.*

2.3 Supply cord: flexible cord for supply purposes, that is fixed to the tumbler dryers.

2.4 Supply leads: Set of wires intended for connecting the tumbler dryers to fixed wiring and accommodated in a compartment within or attached to the appliance.

2.5 Type X attachment: Method of attachment to the supply cord such that it can easily be replaced.

Notes 1. *The supply cord may be "specially prepared" and only available from the manufacturer or its service agent.*

2. *A specially prepared cord may also included a part of the tumbler dryers.*

2.6 Type Y attachment: Method of attachment of the supply cord such that any replacement is intended to be made by the manufacturer, its service agent or similar qualified person.

Note : *Type Y attachment may be used either with an ordinary flexible cord or with a special cord.*

2.7 Type Z attachment: Method of attachment of the supply cord such that it cannot be replaced without breaking or destroying the appliance.

2.8 Class I tumbler dryers : Tumbler dryers in which protection against electric shock does not rely on basic insulation only but which includes an additional safety precaution in that conductive accessible parts are connected to the protective earthing conductor in the fixed wiring of the installation in such a way that conductive accessible parts cannot become live in the event of a failure of the basic insulation.

2.9 class II tumbler dryers : Tumbler dryers in which protection against electric shocks does not rely on basic insulation only but which includes an additional safety precaution, such as double insulation or reinforced insulation, are provided, there being no provision for protective earthing or reliance upon installation conditions.

- Notes** 1. *class II tumbler dryers may be of one of the following types:*
- a) *an appliance having a durable and substantially continuous enclosure of insulating material which envelops all metal parts. With the exception of small parts, such as nameplates, screws, and rivets, which are isolated from live parts by insulation at least equivalent to reinforced insulation; such an appliance is called an insulation-encased Class II appliances;*
 - b) *an appliance having a substantially continuous metal enclosure, in which double insulation or reinforced insulation is used throughout, such as an appliance is called a metal-encased Class II appliance;*
 - c) *an appliance which is a combination of types a) and b);*
2. *The enclosure of an insulation-encased Class II appliance may from a part of the whole of the supplementary insulation or of the reinforced insulation.*
 3. *If an tumbler dryer with double insulation or reinforced insulation throughout has provision for earthing, it is considered to be a Class I of a Class OI appliance.*
 4. *Class II tumbler dryers may be provided with means for maintaining the continuity of protective circuits, provided that such means are within the appliance and are insulated from conductive accessible parts by supplementary insulation.*

3. Classification

- 3.1 Tumbler dryers shall be classified, with respect to protection against electric shock, into 2 classes.
 - 3.1.1 Class I
 - 3.1.2 Class II
- 3.2 Tumbler dryers shall have the degree of protection against harmful ingress of water at least of protected against splashing water (IPX4).

Note : *The degree of protection against harmful ingress of water see TIS 513.*

4. Requirements

- 4.1 Protection against accessibility to live parts
 - 4.1.1 Tumbler dryers shall be constructed and enclosed so that there are adequate protection against accidental contact with live parts.

Note : *An accessible part is not considered to be live if the part is separated from live parts by protective impedance, the current between the part*

and the supply source shall not exceed 2 mA for d.c. and its peak value shall not exceed 0.7 mA for a.c. and moreover for voltage having a peak value over 42.4 V up to and including 450 V the capacitance shall not exceed 0.1 μ F.

Compliance is checked by the test specified in TIS 1372 Part 1, clause 8.1.4.

- 4.1.2 Class II tumbler dryers shall be constructed and enclosed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only. It shall be only be possible to touch with are separated from live parts by double insulation or reinforced insulation.

Compliance is checked by the test specified in TIS 1372 Part 1, clause 8.2.

4.2 Power input and current

- 4.2.1 The power input of the appliance at rated voltage and at normal operating temperature shall not deviate from the rated power input by more than the deviation shown in table 1.

Compliance is checked by the test specified in TIS 1372 Part 1, Clause 10.1.

Table 1 : Power input deviation for tumbler dryers

(Clause 4.2.1)

Power input of the motors	Rated power input of tumbler dryers	Deviation
Not more than 50% of the total rated power input	≤ 200	$\pm 10\%$
	> 200	+ 5% or 20 W (whichever is the greater) - 10%
More than 50% of the total rated power input	≤ 300	$\pm 20\%$
	> 300	+ 15% or 60 W (whichever is the greater)

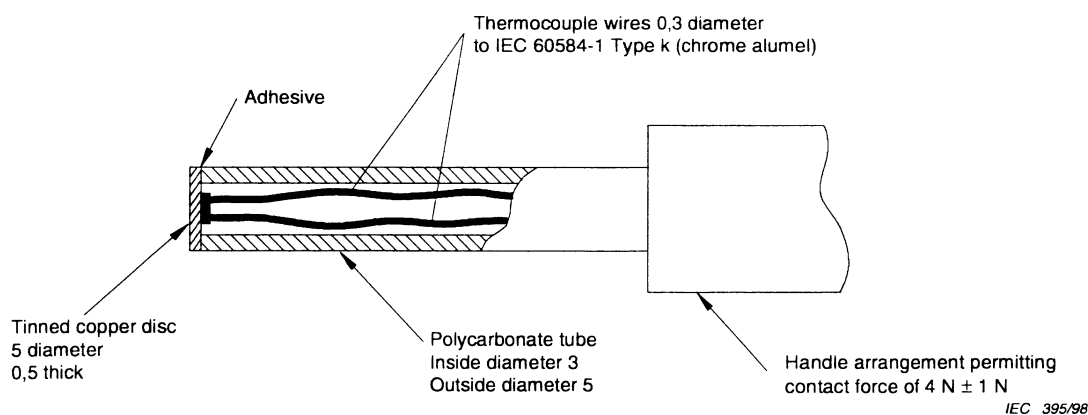
4.3 Heating

- 4.3.1 Tumbler dryers and their surroundings shall not attain excessive temperatures in normal use.

Compliance is checked by the test specified in TIS 1375 Part 1, Clause 11, with the following addition;

4.3.1.1 On testing in accordance with TIS 1375 Part 1, clause 11.2, lint traps are cleaned and then 50% of the area of the filter is blocked.

4.3.1.2 On testing in accordance with TIS 1375 Part 1, clause 11.3, temperature rises of the accessible front surface are measured using the probe shown in figure 1. The probe is applied with a force of $4\text{ N} \pm 1\text{ N}$ to the surface in such a way that the best possible contact between the probe and the surface is ensured.



Note : *The contact face of the disc must be flat.*

The thermocouple must be soldered with care to ensure disc temperature is measured.

Figure 1 : Probe for measuring surface temperature

(Clause 4.3.1.2)

4.3.1.3 In stead of the test specification in TIS 1375 Part 1, clause 11.7, the following applies:

Tumbler dryers incorporating a timer, a humidity sensing control or other time-limiting control are operated in cycles. Each cycle comprises an operating period having a duration equal to the maximum time that can be provided by the control and a rest period of 4 min during which the appliance is reloaded. The test may be ended if the temperature rise of any part does not exceed the value determined during the proceeding cycle by more than 8 K.

Tumbler dryers having a washing and drying function which incorporates a programme operated with the drying programme leading to the highest temperature rise.

Other tumbler dryers are operated continuously until steady conditions are established.

4.3.1.4 On testing in accordance with TIS 1375 Part 1, clause 11.8. The temperature rises of the accessible front surface shall not exceed the following values:

- metal and painted metal parts 60 K
- vitreous-enamelled metal parts 65 K
- glass and ceramic parts 80 K
- plastic parts having a thickness exceeding 0.3 mm 100 K

The temperature rise limit of 100 K also applies to plastic material having a metal finish of thickness less than 0.1 mm.

Note : When the thickness of the plastic coating does not exceed 0.3 mm, the temperature-rise limits of the supporting material applies.

4.4 Leakage current and electric strength at operating temperature.

At operating temperature, the leakage current shall not exceed 3.5 mA or not more than 1 mA per kW of rated power input, whichever is the greater, but not more than 5 mA for stationary class I tumbler dryers.

At operating temperature, the leakage current shall not exceed 0.25 mA for class II tumbler dryers.

Compliance is checked by the test specified in TIS 1372 Part 1, clause 13.

4.5 Moisture resistance

4.5.1 The enclosure of tumbler dryers shall provide the degree of protection against moisture in accordance with the classification of the appliance.

Compliance is checked by the test specified in TIS 1372 Part 1, clause 15.1.

Magnetic valves and similar components incorporated in external hoses for connection to the water mains are subjected to the test specified for IPX7 appliances.

Immediately after the appropriate treatment, tumbler dryers shall withstand the electric strength test specified in 4.6 and inspection shall show that there is no trace of water or insulation which could result in a reduction of creepage distances and clearances below the values specified in clause 4.18.1.

4.5.2 Tumbler dryers subject to spillage of liquid in normal use shall be constructed so that such spillage does not affect their electrical insulation, and shall withstand the electric strength test specified in clause 4.6.

Instead of the test specification in TIS 1375 Part 1, clause 15.2, the following applies:

The drum is filled with wet textile material as specified for normal operation, the mass of the water however, being approximately 1.5 times the mass of the dry textile material.

- 4.5.3 Tumbler dryers shall be proof against humid conditions which may occur in normal use.

Compliance is checked by the test specified in TIS 1372 Part 1, Clause 15.3. Immediately after this treatment, the tumbler dryers withstand the test of clause 4.8.

- 4.6 Leakage current and electric strength

The leakage current of the appliance shall not be excessive and its electric strength shall be adequate, the leakage current shall not exceed 3.5 mA for stationary class I tumbler dryers or not more than 1 mA per kW rated power input, whichever is the greater, with a maximum of 5 mA, and the leakage current shall not exceed 0.25 mA for class II.

Compliance is checked by the tests specified in TIS 1372 Part 1, clause 16.2 and clause 16.3.

- 4.7 Overload protection of transformers and associated circuits

Tumbler dryers incorporating circuits supplied from a transformer shall be constructed so that in the event of short circuits which are likely to occur in normal use, excessive temperatures do not occur in the transformer or in the circuits associated with the transformer.

Compliance is checked by the test specified in TIS 1372 Part 1, Clause 17.

- 4.8 Abnormal operation

Tumbler dryers shall be constructed so that the following risks are kept to be at least: Fire or mechanical change impairing safety or protection against electric shock as a result of abnormal or careless operation, is obviated as far as is practicable.

Electronic circuits shall be designed and applied so that a fault condition will not under the tumbler dryers unsafe with regard to electric shock, fire hazard or dangerous malfunction.

Compliance is checked by the test specified in TIS 1372 Part 1, Clause 19 (with the exception of clause 19.9) with the following addition:

- 4.8.1 Instead of being subjected to the tests of Clause 19.2 and 19.3, appliances are subjected to the test of Clause 4.8.4. If operation without water is considered to be a more unfavourable condition for appliances which are connected to the water mains, the tests are made with the water tap closed. However, this tap is not closed after the appliance has been switched on.

- 4.8.2 Instead of the test specification in TIS 1375 Part 1, clause 19.4, the following applies:

The tumbler dryer is operated under the conditions specified in clause 4.3 at 1.15 times rated power input and with dry textile material. Controls which operate during the test of clause 4.3 and all self-resetting thermal cut-outs which protect the heating element are short-circuited or rendered inoperative simultaneously. The test is terminated at the end of the maximum period allowed by a timer.

- 4.8.3 On testing in accordance with TIS 1375 Part 1, clause 19.13., with the following addition.

The textile material shall not ignite and shall show no charring or glowing.

Note : *Light-brown colouring of the textile material or slight emission of smoke is ignored.*

- 4.8.4 The test of clause 4.8.1 is repeated but with the thermal controls not short-circuited and the drum belt removed. The duration of the test is 90 min or the maximum period allowed by a timer.

If the air circulation is likely to be prevented due to a fault condition, the test is repeated but with the drum belt in position and with the air circulation stopped.

Note : *Care is taken to ensure that the textile material is tumbling properly by reducing the load if necessary.*

If both of these conditions are likely to occur simultaneously, the tests are combined.

4.9 Stability and mechanical hazards

- 4.9.1 Tumbler dryers, other than fixed tumbler dryer, intended to be used on a surface such as the floor or a table shall have adequate stability.

Compliance is checked by the test specified in TIS 1372 Part 1, clause 20.1, the test with the angle of inclination increased to 15° is not made.

- 4.9.2 Moving parts of tumbler dryers, as far as is compatible with use and working of the tumbler dryers, be positioned or enclosed to provide adequate protection against personal injury in normal use.

Protective enclosure guards and similar parts shall be non-detachable parts and shall have adequate mechanical strength.

The unexpected reclosure of self-resetting thermal cut-outs and over-current protective devices shall not cause a hazard.

Compliance is checked by the test specified in TIS 1372 Part 1, Clause 20.2.

- 4.9.3 Appliance shall have means to prevent opening of the during operation or an interlock which disconnects the motor before the door opening exceeds 75 mm.

It shall not be possible to start the motor while the door opening exceeds 75 mm. For appliances with a door opening having a dimension exceeding 20 cm and a drum having a volume exceeding 100 dm³, starting of the motor shall not be possible until a separate means which controls the movement of the drum is operated manually.

Interlocks shall be constructed so that unexpected operation of the appliance is unlikely to occur while the door is open.

Compliance is checked by inspection, by measurement and by manual test with the appliance supplied at rated voltage and under normal operation.

If mean to prevent the door opening incorporates a coil or similar component to lock the door in the closed position, the component is energized and de-energized 6,000 times, six times a minute or at the rate imposed by the construction of the appliance if this is lower.

The locking means and its components shall be fir for further use.

Notes : 1. *The door is opened and closed during the test if this is necessary for the mechanical operation of the interlock.*

2. *Interlocks which can be released by means of the test finger specified in TIS 1375 Part 1, clause 8.1.4 are considered likely to cause unexpected operation of appliance.*

- 4.9.4 For appliances with a door opening having a dimension exceeding 20 cm and a drum volume exceeding 100 dm³, it shall be possible to open the door from the inside with a force not exceeding 70 N.

Compliance is checked by inspection, by measurement and by manual test.

Note : *May be applied the force perpendicular to the plane of the door at a point from the hinges.*

- 4.9.5 Appliances with horizontally hinged doors shall have adequate stability when the open door is subjected to a load.

The empty appliance is placed on a horizontal surface and a mass of 23 kg applied to the centre of the open door. The appliance shall not tilt.

The door and hinges shall not be damaged to such an extent that compliance with this standard is impaired.

Note : *The test is made with the tumbler dryer placed on a horizontal surface even if it can be stacked on top of other appliances.*

4.10 Mechanical strength

- 4.10.1 Tumbler dryers shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use.

Compliance is checked by the test specified in TIS 1372 Part 1, clause 21.

4.11 Construction

- 4.11.1 If the tumbler dryers is marked with protection against dust, degree of protection shall be in accordance with the level marked.

Compliance is checked by the test specified in TIS 513.

- 4.11.2 For stationary tumbler dryers, means shall be provided to ensure all pole disconnection from the supply. Such mean shall be one of the following:

- a supply cord fitted with a plug;
- a switch complying with 4.13.3;
- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided;
- an appliance coupler.

If class I tumbler dryers with heating elements, which is intended to be permanently connected to fixed wiring, incorporated single-pole switches or single-pole protective devices intended to disconnect the heating element from the supply, these shall be connected in the phase conductor.

Compliance is checked by inspection.

- 4.11.3 Tumbler dryers intended to be connected to the supply by means of a plug shall be constructed so that in normal use there is no risk of electric shock from changed capacitors when touching the pins of the plug.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.5.

- 4.11.4 Tumbler dryers shall be constructed so that their electrical insulation cannot be affected by water which could condense on cold surfaces or by liquid which could leak from containers, hoses, couplings and similar parts of tumbler dryers.

Compliance is checked by inspection.

- 4.11.5 For tumbler dryers having compartments to which access can be gained without the aid of a tool and which are likely to be cleaned in normal use, the electrical connections shall be arranged so that they are not subject to pulling during cleaning.

Compliance is checked by inspection and by manual test.

- 4.11.6 Tumbler dryers shall be constructed so that parts such as internal wiring, windings, commutators and brush-caps included insulation are not exposed

to oil, grease or similar substances. Insulation shall be exposed to oil or grease, if necessary. Oil or grease shall have adequate insulating properties.

Compliance is checked by inspection and by test specified in TIS 1375, Part 1, concerned clause .

- 4.11.7 Reset buttons of non-self resetting controls shall be located or protected so that their accidental resetting is unlikely to occur if this could result in a hazard.

Compliance is checked by inspection.

- 4.11.8 Non-detachable parts which provide the necessary degree of protection against electric shock, moisture or contact with moving parts, shall be fixed in a reliable manner and shall withstand the mechanical stress occurring in normal use.

Snap-in devices used for fixing such shall have an obvious locked position. The fixing properties of servicing shall not deteriorate.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.11.

- 4.11.9 Handles, knobs, grips, levers and similar parts shall be fixed in a reliable manner so that they will not work loose in normal use if loosening might result in hazard.

If handles, knobs and similar parts are used to indicate the position of switches or similar components, it shall not be possible to fix them in a wrong position if this might result in a hazard.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.12.

- 4.11.10 Handles shall be constructed so that, when gripped as in normal use, contact between the operator's hand and parts having a temperature rise exceeding the value specified for handles which are held for short periods only in normal use, is unlikely.

Compliance is checked by inspection and, if necessary, by test the temperature rises.

- 4.11.11 Appliances shall have no ragged or sharp edges, other than those necessary for the function of the appliance or accessory, that could create a hazard for the user in normal use or during user maintenance.

Compliance is checked by inspection.

- 4.11.12 Storage hook and the like for flexible cords (if any) shall be smooth and well-rounded.

Compliance is checked by inspection.

- 4.11.13 Automatic cord reels shall be constructed so that they cause

- no undue abrasion or damage to the sheath of the flexible cord;

- no breakage of conductor strands;
- no undue wear of contacts.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.16

- 4.11.14 Spacers intended to prevent the appliance from overheating walls shall be fixed so that it is not possible to remove them from the outside of the appliance by hand or by means of a screwdriver or a stumpler dryerner.

Compliance is checked by inspection and by manual test.

- 4.11.15 Currant-carrying parts and other metal parts, the corrosion of which could result in a hazard, shall be resistant to corrosion under normal conditions of use.

Compliance is checked by the test in TIS 1375 Part 1, clause 22.18

- 4.11.16 Driving belts shall not be relied upon to provide the required level of insulation unless they are constructed to prevent inappropriate replacement.

Compliance is checked by inspection.

- 4.11.17 Direct contact between live parts and thermal insulation shall be effectively prevented, unless such material is non-corrosive, non-hygroscopic and non-combustible.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.20

Notes: 1. *Glass-wool is an example of thermal insulation which is satisfactory for the purpose of this requirement.*

2. *Non-impregnated slag-wool is an example of corrosive thermal insulation.*

- 4.11.18 Wood, cotton, silk, ordinary paper and similar fibrous or hygroscopic material shall not be used as insulation, unless impregnated.

Compliance is checked by inspection.

Note : *Insulating material is considered to be impregnated if the interstices between the fibres of the material are substantially filled with a suitable insulant.*

- 4.11.19 Asbestos shall not be used in the construction of appliances, unless the liberation of dust of impregnated asbestos or of asbestos fibres into the surrounding air is adequately prevented.

Compliance is checked by inspection.

- 4.11.20 Oil containing polychlorinated biphenyl (PCB) shall not be used in component of tumbler dryers.

Compliance is checked by inspection.

- 4.11.21 Bare heating element shall be supported so that, if they rupture, the heating conductor is unlikely to come into contact with earthed metal parts or accessible metal parts.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.24

- 4.11.22 Tumblers dryers shall be constructed so that sagging heating conductors cannot come into contact with accessible metal parts.

Compliance is checked by inspection.

Note : *This requirements may be met providing supplementary insulation or a core to prevent the heating conductors from sagging.*

- 4.11.23 Tumblers connected by protective impedance shall be separated by double insulation or reinforced insulation.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.27.

- 4.11.24 Class II tumbler dryers connected in normal use to the water mains, metal parts conductively in contact with the water shall be separated from live parts by double insulation or reinforced insulation.

Compliance is checked by inspection.

- 4.11.25 Class II tumbler dryers intended to be permanently connected to fixed wiring shall be constructed so that the required degree of protection against electric shock is maintained after installation of the appliance.

Compliance is checked by inspection.

- 4.11.26 Parts of class II construction which serve as supplementary insulation or reinforced installation and which could be omitted during reassembly after servicing shall

(1) be fixed so that they cannot be removed without being seriously damaged, or

(2) be constructed so that they cannot be replaced in an incorrect position and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete.

Compliance is checked by inspection and by manual test.

- 4.11.27 Creepage distances and clearances over supplementary insulation and reinforced insulation shall not be reduced below the values specified 4.18.1 as a result of wear if any wire, screw, nut, washer, spring or similar part become loose or falls out of position, creepage distances and clearances over supplementary insulation or reinforced insulation shall not be reduced to less than 50% of the value specified in 4.18.1

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.31

- 4.11.28 Supplementary insulation and reinforced insulation shall be designed or protected so that the deposition of dirt or the dust resulting from wear of part within the appliance does not reduce creepage distances or clearances below the values specified in 4.18.1

Ceramic material which is not tightly sintered, similar materials or beads alone shall not be used as supplementary insulation or reinforced insulation.

Parts of natural or synthetic rubber used as supplementary insulation shall be resistant to ageing or be arranged and dimensioned so that creepage distances are not reduced below the values specified in 4.18.1 even if cracks occur.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.32

- 4.11.29 Shafts of operating knobs, handles, levers and similar parts shall not be live unless the shaft is not accessible when the part is removed.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.34

- 4.11.30 For construction other than those of class III, handles, levers and knobs which are held or actuated in normal use shall not become live in the event of an insulation fault. If these handles, levers or knobs are of metal and if their shafts or fixings are likely to become live in the event of an insulation fault, they shall either be adequately covered by insulating material or their accessible parts shall be separated from their shafts or fixings by supplementary insulation.

Note: ¹⁾ *The insulation material is considered to be adequate if it complies with the test in TIS 1375 Part 1, clause 16.3, table 5, item 4.*

For stationary tumbler dryers this requirement does not apply to handles, levers and knobs, other than those of electrical components, provided they are either reliably connected to an earthing terminal or earthing or separated from live parts by earthed metal.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.35.

- 4.11.31 For Class II tumbler dryers, capacitors shall not be connected to accessible metal parts and their casings, if of metal, shall be separated from accessible metal parts by supplementary insulation.

This requirement does not apply to capacitor complying with the requirement for protective impedance specified in 4.11.35.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 22.37

- 4.11.32 Capacitors shall not be connected between the contacts of a thermal cut-out.

Compliance is checked by inspection.

- 4.11.33 Lampholders shall be used only for the connection of lamps.

Compliance is checked by inspection.

- 4.11.34 Mercury switches shall be mounted so that the mercury capsule cannot fall out of position or be damaged by the clamping means and they shall be arranged so that, should the capsule break, liquid or vaporous mercury cannot be released so as to contaminate the surroundings.

Compliance is checked by inspection.

- 4.11.35 Protective impedance shall consist of at least two separate components whose impedance is unlikely to change significantly during the lifetime of the appliance. If any one of the components is short-circuited or open-circuited the values specified in 4.1.1 shall not be exceeded.

Compliance is checked by inspection and by measurement.

Note : *Resistors complying with clause 14.1 and capacitors complying with clause 14.2 of TIS 1195 are considered to be appropriate components.*

- 4.11.36 Tumbler dryers which can be adjusted for different voltages shall be constructed so that accidental changing of the setting is unlikely to occur.

Compliance is checked by manual test.

- 4.11.37 Heating elements shall be located or guarded so that they cannot be contacted by textile material.

Compliance is checked by inspection.

- 4.11.38 If the manufacturer states that the tumbler dryer can be placed on top of a washing machine this shall be possible without the tumbler dryer tilting or falling. If this is achieved by attachments, these shall be made available by the manufacturer.

Compliance is checked by the following test:

The washing machine and tumbler dryer are assembled together in accordance with the instructions.

The combination is placed in the most unfavourable position on a surface which is inclined at 5° to the horizontal.

Each tumbler dryer is supplied at rated voltage and under normal operation in turn.

The appliances shall not tilt and the tumbler dryer shall not fall off the washing machine.

4.12 Internal wiring

- 4.12.1 Wireways shall be smooth and free from sharp edges.

Wires shall be protected so that they do not come into contact with burrs, cooling fins similar edges which may cause damage to their insulation.

Holes in metal through which insulated wires pass shall have smooth well-round surfaces or be provided with bushings.

Wiring shall be effectively prevented from coming into contact with moving parts.

Compliance is checked by inspection.

- 4.12.2 Beads and similar ceramic insulators on live wires shall be fixed or supported so that they cannot change their position ; they shall not rest on sharp edges or sharp insulating sleeve, unless the conduit cannot move in normal use.

Compliance is checked by inspection and by manual test.

- 4.12.3 Bare internal wiring shall be rigid and fixed so that, in normal use, creepage distances and clearances cannot be reduced below the values specified in clause 4.18.1.

Compliance is checked by inspection, by measurement and manual test.

- 4.12.4 The insulation of internal wiring shall withstand the electrical stress likely to occur in normal use.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 23.5

- 4.12.5 When sleeving is used as supplementary insulation on internal wiring it shall be retained in position by positive means.

Compliance is checked by inspection and by manual test.

Note : *A sleeve is considered to be fixed by positive means if it can only be removed by breaking or cutting or if it is clamped at both ends.*

- 4.12.6 Conductors identified by the colour combination green/yellow shall only be used for earthing conductors.

Compliance is checked by inspection.

- 4.12.7 Aluminium wire shall not be used for internal wiring.

Compliance is checked by inspection.

Note : *Winding of a motor are not considered as internal wiring.*

- 4.12.8 Stranded conductors shall not be consolidated by lead - tin soldering where they are subjected to contact pressure, unless the clamping means is constructed so that there is no risk of bad contact due to cold flow of the solder.

Compliance is checked by inspection.

Notes : *1. The requirements may be by using spring terminals. Securing screws alone is not considered adequate.*

2. Soldering of the tip of a stranded conductor is allowed.

- 4.12.9 Internal wiring for the connection of magnetic valves and similar components incorporated in hoses outside the appliance shall be at least equivalent to light polyvinyl chloride sheathed cord in comply with TIS 11 or IEC 60227 (code designation 60227 IEC 52).

Compliance is checked by inspection.

4.13 Components

- 4.13.1 Components shall comply with the safety requirement specified in the relevant standards as far as they reasonably apply.

Compliance is checked by the test specified in TIS 1375 Part1, clause 24.1.

- 4.13.2 Electrical Thermostat shall not be fitted with :

- (1) switches or automatic controls in flexible cords..
- (2) devices which cause the protective device in the fixed wiring to operate in the event of a fault in the tumbler dryers.
- (3) thermal cut - outs which can be reset by a soldering operation.

Compliance is checked by inspection.

- 4.13.3 Switches intended to ensure all-pole disconnection of stationary appliances, as required in 4.11.2, shall be directly connected to the terminals and shall have a contact separation of at least 3 mm in each pole.

Compliance is checked by inspection and by measurement.

- 4.13.4 Plugs and socket-outlets and other connecting devices of interconnection cords shall not be interchangeable with plugs and socket-outlets listed in TIS 166 or connections appliance inlet complying with the standard sheets of IEC 320, if direct supply to these parts from the supply mains could give rise to a hazard.

Compliance is checked by inspection and by measurement.

- 4.13.5 Motors not isolated from the supply mains and having basic insulation not designated for the rated voltage of the tumbler dryers, are also subjected to the test specified in TIS 1375 Part 1, Annex F.

- 4.13.6 If a protective device operates during the test of 19.4 it shall be of the non-self-resetting type.

Compliance is checked by inspection.

4.14 Supply connection and external flexible cords

- 4.14.1 Tumbler dryers shall be provided with one of the following means for connection to the supply :

- (1) supply cord fitted with a plug ;
- (2) an appliance inlet having at least the same degree of protection against moisture as required for tumbler dryers.

Compliance is checked by inspection.

- 4.14.2 Tumbler dryers other than stationary tumbler dryers for multiple supply shall not be provided with more than one means of connection to the supply. Stationary tumblers dryers for multiple supply may be provided with more than

one means of connection provided the relevant circuits and adequately insulated from each other.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 25.2.

4.14.3 Tumbler dryers intended to be permanently connected to fixed wiring shall allow the connection of the supply wires after the Tumbler dryers has been fixed to its support and shall be provided with one of the following means for connection to the supply:

- (1) a set of terminals allowing the connection of cable of fixed wiring having the nominal cross-sectional areas specified in Column 3 of Table 3;
- (2) a set of terminal allowing the connection of flexible cords (in this case it is allowed to connect the supply cord before the Tumbler dryers is fixed to its support. The tumbler dryers may be provided with a flexible cord.);
- (3) a set of supply leads accommodated in a suitable compartment;
- (4) a set of terminals and cable entries, conduit entries, knock-outs of glands which allow the connection of the appropriate types of cable or conduit.

Compliance is checked by inspection, by measurement and by using appropriate conductor or conduit if necessary.

Note : *If a fixed is constructed so that parts can be removed to facilitate installation, the requirement is considered to be met if it is possible to connect the supply wires without difficulty after a part of the Tumbler dryers has been fixed to its support. In this case removable parts are to be constructed to be easily reassembled to the part which has been fix in position, without damage to the wiring and without exposing the wiring to stress which may clause damage to the terminals or to the insulation of the wires.*

4.14.4 Supply cord shall be assembled with the appliance by one of the following methods :

- (1) type X attachment ;
- (2) type Y attachment ;
- (3) type Z attachment.

Type X attachment other than those with a specially prepared cord, shall not be used for flat twin tinsel cords.

Compliance is checked by inspection.

4.14.5 Plugs shall not be fitted with more than one flexible cord.

Compliance is checked by inspection.

4.14.6 Supply cord shall have insulation and sheath properties no less than that of polychloroprene sheathed conductor which is equivalent to IEC 245, or synthetic resin sheathed conductor which is equivalent to TIS 11.

Compliance is checked by inspection.

Supply cord conductor shall have nominal cross-sectional area not less than shown in Table 2.

Table 2 : Minimum cross-sectional areas of supply cord conductor
(clause 4.14.6)

Rated current of tumbler dryer A	Nominal cross-sectional areas mm ²
≤ 6	0.75
> 6 and ≤ 10	1
> 10 and ≤ 16	1.5

4.14.7 Supply cords shall not be in contact with sharp points or edges of the appliance.

Compliance is checked by inspection.

4.14.8 The Supply cord of Class I tumbler dryers shall have a green/yellow core which is connected to the earthing terminal of the appliances and to earthing contact of the plug.

Compliance is checked by inspection.

4.14.9 Conductors of supply cords shall not be consolidated by lead-tin soldering where they are subject to contact pressure, unless the clamping means is constructed so that there is not risk of a bad contact due to cold flow of the solder.

Compliance is checked by inspection.

4.14.10 The insulation of the supply cord shall not be damaged when moulding the cord to part of the enclosure.

Compliance is checked by inspection.

4.14.11 Inlet openings shall be provided with a bushing or shall be constructed so that the sheath of the supply cord can be introduced without risk of damage.

Compliance is checked by inspection and by manual test.

4.14.11.1 Inlet bushings shall

- (1) be shaped to prevent damage to the supply cord;
- (2) not be detachable parts.

Compliance is checked by inspection and by manual test.

4.14.11.2 At inlet opening, the insulation the conductor of a supply cord and the enclosure of the tumbler dryers shall consist of the insulation of the conductor and in conductor and in addition at least two separate insulation.

Only one separate insulation is required if the enclosure at the inlet opening is of insulation material.

The separate insulation shall consist of

- the sheath of a supply cord at least equivalent to that of that of a cord complying with TIS 11 or IEC 245, or
- a lining or bushing of insulation material complying with the requirements of 4.18.2 for supplementary insulation.

Compliance is checked by inspection.

4.14.12 Tumbler dryers provided with a supply cord shall have cord anchorages such that the conductors are relieved from strain, twisting, Where they are connected within the tumbler dryer that the insulation of the conductors is protected from abrasion. The requirement also applies to tumbler dryers intended to be permanently connected to the fixed wiring by flexible cord.

It shall not be possible to push the cord into the tumbler dryer to such an extent that the cord or internal part of the tumbler dryer could be damaged.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 25.15.

4.14.13 Cord anchorages for type X attachment shall be constructed and located so that

- replacement of the cord is easily possible;
- it is clear how the relief from strain and the prevention of twisting are obtained ;
- they are suitable for the different types of cord which may be connected, unless the cord is specially prepared ;
- the cord cannot touch the clamping screws of the cord anchorage if these screws are accessible, unless they are separated from accessible metal parts by supplementary insulation ;
- the cord is not clamped by metal screw which bears directly on the cord ;
- at least one part of the cord anchorage is securely fixed to the tumbler dryer unless it is part of a specially prepared cord ;
- screws which have to be operated when replacing the cord do not fix any other component. However this dose not apply if

- the screws are omitted or components are incorrectly positioned and the tumbler dryer becomes inoperative or is obviously incomplete ;
 - the parts intended to be fastened by them cannot be removed without the aid of a tool during the replacement of the cord.
- for class I tumbler dryers, they are of insulating material or are provided with an insulating lining, unless a failure of the insulation of the cord does not make accessible metal parts live ;
- for class II tumbler dryers, they are of insulating material or if of metal, they are insulated from accessible metal parts by supplementary insulation.

Notes:

1. *If the cord anchorage for type X attachment comprises one or clamping members to which pressure is applied by means of nuts engaging with studs which are securely attached to the tumbler dryer, the cord anchorage is considered to have one part securely fixed to the tumbler dryer, even if the clamping member can be removed from the studs.*
2. *If the pressure on the clamping members is applied by means of one or more screws engaging with separate nuts or with a thread in a part which is integral with the tumbler dryer, the cord anchorage is not considered to have one part securely fixed to the appliance. This does not apply if one of the clamping members is fixed to the appliance is of insulating material and shaped so that it is obvious that the surface is one of the clamping members.*

Compliance is checked by the test specified in TIS 1375 Part 1, clause 25.16.

- 4.14.14 For type Y attachment and type Z attachment, cord anchorages shall be adequate.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 25.15.

- 4.14.15 Cord anchorages shall be arranged so that they are only accessible with the aid of a tool or constructed so that the cord can only be fitted with the aid of a tool.

Compliance is checked by inspection.

- 4.14.16 The insulated conductors of the supply cord for type Y attachment shall be additionally insulated from accessible metal parts by basic insulation for (Class I tumbler dryers), and by supplementary insulation for class II tumbler dryers. This insulation may be provided by the sheath of the supply cord or by other means.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 25.20.

4.14.17 The space for connection of the supply cables for fixed wiring or for the connection of the supply cord provided for type X attachment shall be constructed.

- (1) to permit checking that the supply conductors are correctly positioned and connected before fitting any cover ;
- (2) for portable appliances, so that the uninsulated end of a conductor, should it become free from the terminal, cannot come into contact with accessible metal parts, unless the end of the cord is such that the conductors are unlikely are unlikely to slip free.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 25.21.

4.14.18 Appliance inlets shall

- (1) be located or enclosed so that live parts are not accessible during insertion or removal of connector ;
- (2) be located so that the connector can be inserted without difficulty ;
- (3) not be an appliance inlet for cold conditions if the temperature rise of external metal parts of the appliance exceeds 75 K during the test of clause 4.3, unless the appliance is such that the supply cord is not likely to touch such metal parts in normal use.

Compliance is checked by inspection.

4.14.19 Interconnection cords shall comply with the requirements for the supply cord, except that:

4.14.19.1 the cross-sectional area of the conductors of the interconnection cord is determined on the basis of the maximum current carried by the conductor during the test of clause 4.3 and not by the rated current of the tumbler dryers.

4.14.19.2 the thickness of the insulation of the conductor may be reduced if the voltage of the conductor is less than the rated voltage.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 25.23.

4.14.20 Detachable interconnection cords shall not be provided with a means for connection such that accessible metal parts are live when the connection is disconnected due to the disengagement of one the connecting means.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 25.24.

4.14.21 Interconnection cords shall not be detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 25.25.

4.15 Terminals for external conductors

4.15.1 Appliances with type X attachment and appliances for connections to fixed wiring shall be provide with terminal in which connection is made by means of screws, nuts or equally effective devices. This requirement dose not apply to appliances provided with supply leads or provided with a type X attachment having a specially prepared cord.

Screws and nuts shall not serve to fix any other component, except that they may also clamp internal conductors if these are arranged so that they are unlikely to be displaced when fitting the supply conductors.

Compliance is checked by inspection.

4.15.2 For tumbler dryers with type X attachment, soldered constructions may be used for the connection of external conductors, provided that the conductor is positioned or fixed so that reliance is not placed upon the soldering alone to maintain the conductor in position. However soldering alone may be used if barriers are provided so that creepage distances and clearances between live parts and other metal parts cannot be reduced to less than 50% of the values specified in 4.18.1 if the conductor becomes free at the soldered joint.

For tumbler dryers with type Y and type Z attachment, soldered, welded, crimped and similar connections may be used for the connection of external conductors. For Class II tumbler dryers, the conductor shall be positioned or fixed so that reliance is not placed upon the soldering, crimping or welding alone to maintain the conductor in position. However soldering, welding or crimping alone may be used if barriers are provided so that creepage distances and clearances between live parts and other metal parts cannot be reduced to less than 50 % of the values specified in 4.18.1. If the conductor becomes free at the soldered or welded joint or slips out of the crimped connection.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 26.1.2.

4.15.3 Terminals for type X attachment and for connection to fixed wiring shall allow the connection of connectors having nominal cross – sectional areas shown in table 3. However if a specially prepared cord is used, the terminals need only be suitable for the connection of that cord.

Compliance is checked by inspection, by measurement and by fitting cables or cord of the smallest and largest cross-sectional areas specified.

Table 3 – Nominal cross-sectional areas of conductors
(clause 4.14.3(1) and clause 4.15.3)

Rated current of tumbler dryers A	Nominal cross-sectional areas mm ²	
	Flexible cords	Cables for fixed wiring
≤ 3	0.5 to 0.75	1 to 2.5
> 3 and ≤ 6	0.75 to 1	1 to 2.5
> 6 and ≤ 10	1 to 1.15	1 to 2.5
> 10 and ≤ 16	1.5 to 2.5	1.5 to 4

- 4.15.4 Terminals for the supply cord shall be suitable for their purpose. Terminals with screw clamping and screwless terminals shall not be used for the connection of the conductors of flat twin tinsel unless the ends of the conductors are fitted with a device suitable for use with screw terminals.
Compliance is checked by the test specified in TIS 1375 Part 1, clause 26.3.
- 4.15.5 Terminals for type X attachment and those for connection to fixed wiring shall be fixed so that when the clamping means is tightened or loosened
- the Terminals dose not loosened ;
 - internal wiring is not subjected to stress ;
 - creepage distances and clearances are not reduced below the values specified in 4.18.1
- Compliance is checked by the test specified in TIS 1375 Part 1, clause 26.4.*
- 4.15.6 Terminals for type X attachment and those for connection to fixed wiring shall be constructed so that they clamp the conductor between metal surfaces with sufficient contact pressure and without damaging the conductor.
Compliance is checked by the test specified in TIS 1375 Part 1, clause 26.5.
- 4.15.7 Terminals for type X attachment, except those with a specially prepared cord and those for connection to fixed wiring, shall not require preparation of the conductor. They shall be constructed or placed so that conductor cannot slip out when clamping screws or nuts are tightened.
Compliance is checked by the test specified in TIS 1375 Part 1, clause 26.6.
- 4.15.8 Terminals of the pillar type shall be constructed and located so that the end of a conductor introduced into the hole is visible or can pass beyond the threaded hold for a distance at least equal to half the nominal diameter of the screw or 2,5 mm, whichever is the greater.

Compliance is checked by inspection and by measurement.

- 4.15.9 Terminals, including the earthing terminal, for connection to fixed wiring shall be located close to each other.

Compliance is checked by inspection.

- 4.15.10 Terminals for type X attachment shall be accessible after removal of a cover or part of the enclosure.

Compliance is checked by inspection.

- 4.15.11 Terminals shall not be accessible without the aid of a tool, even if their live parts are not accessible.

Compliance is checked by inspection and by manual test.

- 4.15.12 Terminals for type X attachment shall be located or shielded so that if a wire of a stranded conductor escapes when the conductors are fitted, there is no risk of accidental connection between live parts and accessible metal parts and for Class II construction, between live parts and separated from accessible metal parts by supplementary insulation only.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 26.11.

4.16 Provision for earthing

- 4.16.1 Accessible metal parts of Class I tumbler dryers which may become live in the event of an insulation fault, shall be permanently and reliably connected to an earthing terminal within the appliance or to the earthing contact of the appliance inlet.

Earthing terminal and earthing contact shall not be connected to the neutral terminal.

Class II tumbler dryers shall have no provision for earthing.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 27.1.

- 4.16.2 Terminal with screw clamping shall comply with the relevant requirements of clause 4.15.

Screwless terminals shall comply with TIS 902, Appendix B.

Terminals for the connection of external equipotential bonding conductors shall allow the connection of conductors having nominal cross – sectional areas of 2,5 mm² to 6 mm² and shall not be used to provide earthing continuity between different parts of the tumbler dryers. It shall not be possible to loosen the conductors without the aid of a tool.

The clamping means of earthing terminals shall be adequately secured against accidental loosening.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 27.2.

- 4.16.3 If a detachable part is plugged into another part of the tumbler dryers and has an earth connection, this shall be made before the current-carrying connections are established when placing the part in position and the current-carrying connections shall be separated before the earth connection is broken when removing the part.

For tumbler dryer with supply cords, the arrangement of the terminals or the length of the conductors between the cord anchorage and the terminal, shall be such that the current-carrying conductors become taut before the earthing conductor if the cord slips out of the cord anchorage.

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

- 4.16.4 All parts of the earthing terminal intended for the connection of external conductors shall be such that there is no risk of corrosion resulting from contact between these parts and the copper of the earthing conductor or any other metal in contact with these parts.

Parts providing earthing continuity, other than parts of a metal frame or enclosure shall be of coated or uncoated metal having adequate resistance to corrosion. If such parts are of steel, they shall be provided at the essential areas with an electroplated coating having a thickness of at least 5 µm.

Parts of coated or uncoated steel which are only intended to provide or to transmit contact pressure shall be adequately protected against rusting.

If the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloy, precautions shall be taken to avoid the risk of corrosion resulting from contact between copper and aluminium or its alloys.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 27.4.

- 4.16.5 The connection between the earthing terminal or earthing contact and earthed metal parts shall have low resistance.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 27.5

4.17 Screws and connections

- 4.17.1 Fixings, the failure of which may impair compliance with this standard and electrical connections shall withstand the mechanical stresses occurring in normal use.

Screws used for these purposes shall not be of metal which is soft or liable to creep, such as zinc or aluminium. If they are of insulating material they shall have a nominal diameter of at least 3 mm and they shall not be used for any electrical connection.

Screws transmitting electrical contact pressure shall screw into metal.

The following screws shall not be of insulating material.

- (1) Screws of which if metal screw are used instead could impair the supplementary insulating or reinforced insulation.
- (2) Screws which may be removed when replacing a supply cord having a type X attachment or when undertaking user maintenance shall not be of insulating material if their replacement by a metal screw could impair basic insulation.

Note : *Electrical connection include earthing connections.*

Compliance is checked by the test specified in TIS 1375 Part 1, clause 28.1.

- 4.17.2 Electrical connections shall be constructed so that contact pressure is not transmitted through insulating material which is liable to shrink or to distort unless there is sufficient resiliency in the metallic part to compensate for any possible shrinkage or distortion of the insulating material.

Note : *Ceramic material is not liable to shrink or to distort.*

Compliance is checked by the test inspection.

- 4.17.3 Space-threaded (sheet metal) screw shall not be used for the connection of current-carrying parts, unless they clamp these directly in contact with each other.

Thread-cutting (self-tapping) screws shall not be used for the electrical connection of current-carrying parts, unless they generate a full form standard machine screw thread. Such screw shall not be used if they are likely to be operated by the user or installer unless the thread is formed by a swaging action.

Thread-cutting space-threaded screws may be used to provide earthing continuity, provided that it is not necessary to disturb the connection in normal use and that at least two screws are used for each connection.

Compliance is checked by the test inspection.

- 4.17.4 Screws and nuts which make a mechanical between connection between different parts of the appliance shall be secured against loosening if they also make electrical connections or provide earthing continuity.

Rivets used for electrical connections shall be secured against loosening if these connections are subject to torsion in normal use.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 28.4.

4.18 Creepage distance, clearances and distances through insulation

- 4.18.1 Creepage distances and clearances shall not be less than the values in millimetres shown in Table 4.

If a resonant voltage occurs between the pint where a winding and a capacitor are connected together and metal parts separated from live parts by basis insulation only, creepage distances and clearances shall not be less than values specified for the values of the voltage produced by the resonance, these values being increase by 4 mm in the case of reinforced insulation.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 29.1.

4.18.2 The distance through insulation between metal parts shall not less than 1.0 mm if they an separated by supplementary insulation and not be less than 2.0 mm if they an separated by reinforced insulation.

This requirements also does not apply if the insulation applied in thin sheet from, other than mica or similar material and

- (1) for supplementary insulation, consists of at least two layers, provided that each of the layers withstands the electric strength test for supplementary insulation;
- (2) for reinforced insulation, consists of at least three layers, provided that any two layers together withstands the electric strength test for reinforced insulation.

This requirements also does not apply If the supplementary insulation or the reinforced insulation is inaccessible and meets one of the following conditions:

- the maximum temperature rise determined during the tests of clause 4.8 does not exceed the value specified in clause 4.3
- the insulation, after having been conditioned 168 h in an oven maintained at a temperature equal to 50 K in excess of the maximum temperature rise determined the tests of clause 4.8 withstands the electric strength test of 4.6, this test being made on the insulation both at the temperature occurring in the oven and after cooling to approximately room temperature.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 29.2.

Table 4 : Minimum creepage distances and clearances
(Clause 4.18.1)

Distance	Creepage distances	clearances
Between live parts of different potential ¹⁾ - if protected against deposition of dirt ²⁾ - if not protected against deposition of dirt - if lacquered or enamelled windings	2.0 3.0 2.0	2.0 2.5 2.0
Between live parts and other metal parts over basic insulation		

- if protected against deposition of dirt ²⁾ • if of ceramic, pure mica and similar material • if of other material	2.5 ³⁾ 3.0	2.5 ³⁾ 2.5 ³⁾
- if not protected against deposition of dirt	4.0	3.0
- if the live parts are lacquered or enamelled windings	2.0	2.0
- at the end of tubular sheathed type heating electrical	1.0 ⁵⁾	1.0 ⁴⁾
Between live parts and other metal parts over reinforced insulation :		
- if the live parts are lacquered or enamelled windings	6.0	6.0
- for other live parts	8.0	8.0
Between metal parts separated by supplementary insulation	4.0	4.0
Between metal parts in recesses in the mounting face of the appliance and the surface to which it is fixed	6.0	6.0

Notes : 1) *The clearances specified do not apply to the air gap between the contacts of automatic controls, switches of micro-gap construction and similar devices or to the air gap between the current-carrying members of such devices where the clearance varies with the movement of the contacts.*

2) *In general, the interior of a tumbler dryer having a reasonably dust - proof enclosure is considered to be protected against deposition of dirt, provided the appliance does not generate dust within itself ; her metal sealing is not required.*

3) *If the parts are rigid and located by mouldings or if the construction is such that there is no likelihood of the distance being reduced by distortion or movement of the parts. This value may be reduced to 2.0 mm.*

4) *If protected against deposition of dirt.*

5) *If over ceramic, pure mica and similar materials, protected against deposition of dirt.*

4.19 Resistance to heat, fire and tracking

4.19.1 The following parts, the deterioration of which might cause the tumbler dryer to fail to comply with the standard, shall be sufficiently resistance to heat.

- (1) External parts of non-material
- (2) Parts of insulating material supporting live parts insulating connecting,
- (3) Parts of thermoplastic material providing supplementary insulators or reinforced insulations.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 30.1

4.19.2 Parts of non-metallic material shall be resistant to ignition and spread of fire. This requirement does not apply to decorative trims, knobs and other parts

not likely to be ignited to propagate flames originating from inside the tumbler dryers.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 30.2, with the exception of 30.2.2.

4.19.3 Insulating material across which a tracking part may occur shall have adequate resistance to tracking, taking into account the severity of the duty conditions.

- between live parts of different potential;
- between live parts and earthed metal parts;
- across insulating material of commutators and brush-caps.

Switching devices with moving contacts, other than those manually operated and those intended to operate only during abnormal operation, are considered to be subjected to extra-severe duty conditions.

Switching devices with moving contacts intended to operate only abnormal operation and other parts of insulating materials are also considered to be subjected to extra-severe duty conditions, unless they are enclosed or located so that pollution by condensation is unlikely to occur. In this case they are considered to be subjected to severe duty conditions.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 30.3.

4.20 Resistance to rusting

4.20.1 Ferrous parts, the rusting of which might cause the tumbler dryer to fail to comply with this standard, shall be adequately protected against rusting.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 31.

4.21 Radiation, toxicity and similar hazards.

4.21.1 Tumbler dryers shall not be emit harmful radiation or present a toxic or similar hazard.

Compliance is checked by the test specified in TIS 1375 Part 1, clause 32.

5. Marking and Labelling

5.1 On each Tumbler dryers shall at least numbers, letters or marking to indicate the following which shall be legible, clear and indelible.

- (1) Rated voltage or rated voltage range in volts or V.
- (2) Rated frequency in Hertz or HZ.
- (3) Rated power input in Watts or W.
- (4) Rated current in amperes or A.

- (5) Model or type reference.
- (6) Symbol for class II tumbler dryers only.
- (7) Symbol for degree of protection against ingress of water (see clause 3.2)
- (8) The maximum mass in kilogrammes of dry textile material.
- (9) Name of manufacture or factory or registered trade mark.

5.2 Tumbler dryers shall state the following instructions which shall be legible in normal use.

- the tumbler dryers is not to be used if chemicals have been used for cleaning;
- the lint trap is to be cleaned frequently if applicable.

5.3 Removable heating elements shall be marked with the

- (1) rated voltage or rated voltage range in volts;
- (2) rated power input in watts or kilowatts;
- (3) symbol for degree of protection against ingress of water (see clause 3.2);
- (4) model or type reference;
- (5) name of manufacture or factory or registered trade mark.

- 5.4 Terminals intended exclusively for the neutral connection shall be indicated by the letter N, intended exclusively for the potential conductor shall be indicated by the letter L, and protective earthing Terminals shall be indicated by the symbol



- 5.5 Switches which may give rise to a hazard when operated shall be marked or placed so as to indicate clearly which parts of the tumbler dryers they control.

- 5.6 The different positions of switches on stationary appliances and the different positions of controls on all appliances shall be indicated by figure, letters or other visual be indicated by a higher figure.

If figures are used for indicating the different positions, the off position shall be indicated by the figure 0 and the position for a greater output, input, speed, cooling effect, etc., shall be indicated by a higher figure.

If letters are used for indicating, the off position shall be indicated in Thai language.

- 5.7 Control devices intended to be adjusted during installation or in normal use shall be provided with direction for adjustment to increase or decrease the values.

- 5.8 Tumbler dryers shall be provided with operation manual giving details of installation including necessary part number for installation which does not come with tumbler dryers.

If a tumbler dryer is not provided with a supply cord and a plug or with other means for disconnection from the supply having a contact separation of at least 3 mm in all poles, the instruction shall state that such means for disconnection must be incorporated in the fixed wiring.

The instructions for use for portable tumbler dryer not intended to be immersed in water for cleaning.

The instructions for use for tumbler dryers intended to be used with a connector incorporating a thermostat shall state that only the appropriate connectors must be used.

- 5.9 In case foreign language is used, the meaning shall correspond that of Thai specified clause.

- 5.10 Any person who manufacture products conforming to this standard may use the standards mark in connection with his products only after having received a license from the industrial product standard council.

6. Sampling and criteria for conformity

6.1 Lot tumbler dryers of the same type and classification, having the model, same rated power, and manufacturing or delivering or purchasing at the same period of time.

6.2 Sampling and criteria for conformity shall comply with the sampling plan specified below or with other technically equivalent plan.

6.2.1 Sampling

One sample shall be drawn at random from a lot.

6.2.2 Criteria for conformity

Provided the sample meets all the requirements of clause 4 and 5, that lot of tumbler dryers shall be deemed to comply with this standard.
