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**Safety of household and
similar electrical appliances—
Part 2 : Particular requirements
for refrigerating appliances
and ice-makers**

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refrigerators, freezers, domestic

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Foreword

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Safety of household and similar electrical appliances— Part 2 : Particular requirements for refrigerating appliances and ice-makers

Introduction This Japanese Industrial Standard has been prepared based on IEC 60335-2-24, *Safety of household and similar electrical appliances—Part 2 : Particular requirements for refrigerating appliances and ice-makers* published in 1997 as the fourth edition. However, in this Standard specification items and contents not stated in the International Standard are added.

The portions of this Standard underlined with dotted lines show the matters not included in the International Standard.

1 Scope This Standard deals with the safety of the following appliances, their **rated voltage** being not more than 250 V for single-phase appliances, 480 V for other appliances and 24 V d.c. for appliances when battery operated:

- **refrigerating appliances** for household and similar use;
- **ice-makers** incorporating a motor-compressor and **ice-makers** intended to be incorporated in frozen food storage compartments;
- **refrigerating appliances** and **ice-makers** for use in camping, touring caravans and boats for leisure purposes.

These appliances may be operated from the mains, from a separate battery or operated either from the mains or from a separate battery.

This Standard does not cover features of the construction and operation of those **refrigerating appliances** which are dealt with in ISO standards.

Appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as appliances 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 appliances which are encountered by all persons in and around the home.

Remarks 1 The definition of “sealed motor compressor” is stated in IEC 60335-2-34.

2 The requirements for safety of refrigerant is included in ISO 5149.

3 (Provisions in corresponding International Standard are not adopted.)

4 This Standard does not apply to

- appliances intended to be used in the open air;
- appliances designed exclusively for industrial purposes;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);

- appliances incorporating a battery intended as a power supply for the refrigerating function;
 - appliances assembled on site by the installer;
 - appliances with remote motor-compressors;
 - motor-compressors (**IEC 60335-2-34**);
 - ice-cream appliances with incorporated motor-compressors (**IEC 60335-2-57**).
- 5 The International Standard corresponding to this Standard is given below.

IEC 60335-2-24 *Safety of household and similar electrical appliances—Part 2 : Particular requirements for refrigerating appliances and ice-makers*

2 Definitions For the principal terms used in this Standard, clause 2 of **JIS C 9335-1** is applicable except as follows:

2.2.9 normal operation

2.2.9.1 normal operation of refrigerating appliances Refrigerating appliances are operated at an ambient temperature according to 4.7, empty, with the doors and lids closed. User adjustable temperature control devices which control the operation of the motor-compressor in **compression-type appliances**, are short-circuited or otherwise rendered inoperative.

2.2.9.2 normal operation of ice-makers Ice-makers are operated at an ambient temperature according to 4.7, with the supply water at a temperature of $(15 \pm 2) ^\circ\text{C}$.

2.2.9.3 normal operation of incorporated ice-makers Incorporated ice-makers are operated at the normal temperature of the frozen food storage compartment, with the supply water at a temperature of $(15 \pm 2) ^\circ\text{C}$.

2.101 refrigerating appliance Enclosed thermally insulated appliance of suitable volume for household use, cooled by an incorporated device and having one or more compartments intended for the preservation of foodstuffs.

2.102 compression-type appliance Appliance in which refrigeration is effected by the vaporization at low pressure in a heat exchanger (evaporator) of a liquid refrigerant, the vapour thus formed being restored to the liquid state by mechanical compression at a higher pressure and subsequent cooling in another heat exchanger (condenser).

2.103 ice-maker Appliance in which ice is made by freezing water by a device consuming electrical energy and having a compartment for storing the ice.

2.104 incorporated ice-maker Ice-maker specially designed to be incorporated into a frozen food storage compartment and without independent means for freezing water.

2.105 heating system Heating element with associated components such as timers, switches, thermostats and other controls.

2.106 absorption-type appliance Appliance in which refrigeration is effected by the evaporation in a heat exchanger (evaporator) of a liquid refrigerant, in the liquid state, the resulting vapour being then absorbed by an absorbent medium from which it is subsequently expelled at a higher partial vapour pressure by heating and liquefied by cooling in another heat exchanger (condenser).

2.107 condenser Heat exchanger in which, after compression, vaporized refrigerant is liquefied by losing heat to an external cooling medium.

2.108 evaporator Heat exchanger in which, after pressure reduction, the liquid refrigerant is vaporized by absorbing heat from the medium to be refrigerated.

3 General requirement The general requirement is as stated in clause 3 of JIS C 9335-1.

4 General conditions for the tests For general conditions for the test, clause 4 of JIS C 9335-1 is applicable except as follows:

4.2 Addition:

Remarks : Separate samples of the motor-compressor may be needed for the tests of 19.1.

4.3 Addition:

Before testing, the appliance shall be operated at **rated voltage** for 24 h.

The test of 11.102 is carried out immediately after the tests of clause 13.

The test of 15.105 is carried out immediately after the test of 11.102.

The tests of 15.102, 15.103 and 15.104 are carried out immediately after the test of 15.2.

4.4 Replacement:

Tests are carried out using each source of energy (electricity, gas or other fuel) in turn. Gas appliances are supplied at the appropriate rated pressure.

Tests are additionally carried out with all combinations of energy sources supplied simultaneously unless this is prevented by interlocking devices.

4.7 Addition:

Tests according to clauses 10, 11, 13 and subclause 19.103 are carried out at an ambient temperature of:

(32 ± 1) °C on appliances of extended temperate (SN) and temperate (N) classes;

(38 ± 1) °C on appliances of subtropical (ST) class;

(43 ± 1) °C on appliances of tropical (T) class.

Appliances classified for several climatic classes are tested at the ambient temperature relevant to the highest climatic class.

Other tests are carried out at an ambient temperature of $(20 \pm 5) ^\circ\text{C}$.

Remarks : Steady conditions are considered to be established when three successive readings of the temperature, taken at approximately 60 min intervals, at the same point of any operating cycle, do not differ by more than 1 K.

4.8.1 Addition:

Appliances which can be battery operated are tested at the more unfavourable polarity when the supply terminals or terminations for the connection of the battery have no indication for polarity.

4.9 Addition:

Appliances incorporating an **ice-maker** are tested with the **ice-maker** operating to give the most unfavourable results.

4.101 Appliances which are constructed so that an **ice-maker** may be incorporated are tested with the intended **ice-maker**.

4.102 Unless otherwise stated, **compression-type appliances** with **heating systems** and Peltier-type appliances are tested as **combined appliances**.

5 Void

6 Classification The clause 6 of JIS C 9335-1 is applicable except as follows:

6.101 Appliances shall be of one or more of the following climatic classes:

- appliances of extended temperate class (SN);
- appliances of temperate class (N);
- appliances of subtropical class (ST);
- appliances of tropical class (T).

Compliance is checked by visual inspection.

Remarks : The climatic classes are specified in ISO standards.

7 Marking and instructions For marking and instruction, clause 7 of JIS C 9335-1 is applicable except as follows:

7.1 Addition:

Appliances shall also be marked with

- the power input, in watts, of **heating systems**, if greater than 100 W;
- the defrosting input, in watts, if greater than the input corresponding to the **rated power input**;
- the letters SN, N, ST or T indicating the climatic class of the appliance;
- the maximum rated wattage of lamps, in watts;

- the total mass of the refrigerant;

Remarks : For absorption-type appliances using ammonia, the total mass of the refrigerant is considered to be the mass of ammonia used.

- for a single component refrigerant, at least one of the following:

- the chemical name,
- the chemical formula,
- the refrigerant number;

- for a blended refrigerant, at least one of the following:

- the chemical name and nominal proportion of each of the components,
- the chemical formula and nominal proportion of each of the components,
- the refrigerant number and nominal proportion of each of the components,
- the refrigerant number of the refrigerant blend.

Appliances which can be mains and battery operated shall be marked with the battery voltage.

Appliances which can be battery operated shall be marked with the type of battery, distinguishing between rechargeable and non-rechargeable batteries, if necessary, unless the type is irrelevant for the operation of the appliance.

The means provided for connection of any additional electrical supply shall be marked with the voltage and nature of the supply.

Appliances designed for incorporating an **ice-maker** shall be marked with the maximum power input for an **incorporated ice-maker**, if greater than 100 W.

Appliances shall be marked with details of the source of supply other than electrical, if any.

Ice-makers without automatic water level control shall be marked with the maximum permissible water level.

7.10 Addition:

Remarks : As an alternative, temperature values in degrees Celsius may be indicated on a control scale.

7.12 Addition:

The instructions for **refrigerating appliances** and **ice-makers** for camping or similar use shall include the substance of the following:

- suitable for camping use;
- the appliance may be connected to more than one source of energy;

Remarks : This item is not applicable to appliances which are intended to be supplied by electricity only.

- the appliance shall not be exposed to rain

Remarks : This item is not applicable to appliances with a degree of protection against harmful ingress of water of at least IPX4.

The instructions for ice-makers not intended to be connected to the water supply shall state the substance of the following warning:

WARNING: Fill with potable water only.

7.12.1 Addition:

Instructions shall include the method for replacing illuminating lamps.

For appliances designed for incorporating **ice-makers**, the instructions shall include the types of **ice-makers** which can be incorporated.

The instructions shall include information on the installation of **incorporated ice-makers** which are available as optional accessories and intended to be installed by the user. If it is intended that **incorporated ice-makers** are to be installed only by the manufacturer or its service agent, this shall be stated.

The instructions for **ice-makers** intended to be connected to the water supply shall state:

- the maximum permissible inlet water pressure, in pascals or bars;
- the minimum permissible inlet water pressure, in pascals or bars, if this is necessary for the correct operation of the appliance;
- For some type of **ice-makers**, the substance of the following warning:

WARNING: Connect to potable water supply only.

7.15 Addition:

The marking of the maximum rated wattage of illuminating lamps shall be easily discernible while the lamp is being replaced.

7.101 For appliances which can be battery operated the supply terminals or terminations for connections to the battery shall be clearly indicated by the symbol “+” or the colour red for the positive polarity, and by the symbol “-” or the colour black for the negative polarity, unless the polarity is irrelevant.

Compliance is checked by visual inspection.

8 Protection against access to live parts For protection against access to live parts clause 8 of JIS C 9335-1 is applicable except as follows:

8.1.1 Modification:

Replace the second paragraph of the test specification by the following:

Lamps are not removed, provided that the appliance can be isolated from the supply by means of a plug or an all-pole switch. However, during the insertion or removal of lamps, protection against contact with live parts of the lamp cap shall be ensured.

Remarks : The lampholders complying with IEC 60238 are considered to comply with this sub-clause.

9 Starting of motor operated appliances For starting of motor-operated appliances, clause 9 of JIS C 9335-1 is applicable.

10 Power input and current For power input and current, clause 10 of **JIS C 9335-1** is applicable except as follows:

Sub-clauses **10.1** and **10.2** are revisions.

10.1 Modification:

Replace the third dashed item of the first paragraph of the test specification by the following:

- the appliance being operated under **normal operation** except that user adjustable temperature controls are set to give the lowest temperature.

Addition:

The power input is considered to be stabilized when steady conditions are established.

A representative period is one between the making and the breaking of the temperature control, or between the highest and lowest values of power input measured, excluding starting power input but including the power input of the **incorporated ice-maker**, if any.

Remarks : The power input of a defrosting system which is separately marked on the appliance is not taken into consideration during the test.

10.2 Modification:

Replace the third dashed item of the first paragraph of the test specification by the following:

- the appliance being operated under **normal operation** except that user adjustable temperature controls are set to give the lowest temperature.

The current is considered to be stabilized when steady conditions are established.

A representative period is one between the making and the breaking of the temperature control or between the highest and lowest values of current measured, excluding starting current but including the current of the **incorporated ice-maker**, if any.

Remarks : The current of a defrosting system which is separately marked on the appliances is not taken into consideration during the test.

10.101 The power input of the defrosting system shall not deviate from the defrosting power input marked on the appliance by more than the deviation shown in Table 1 of **JIS C 9335-1**.

Compliance is checked by operating the appliance at **rated voltage** and measuring the power input of the defrosting system after the power input has stabilized.

10.102 The power input of any auxiliary systems (**heating system**) shall not deviate from the power input of these systems marked on the appliance by more than the deviation shown in Table 1 of **JIS C 9335-1**.

Compliance is checked by operating the appliance at **rated voltage** and measuring the power input of the auxiliary system after the power input has stabilized.