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JIS C 9335-2-90 : 2003 (JEMA)

**Household and similar electrical
appliances—Safety—
Part 2-90 : Particular requirements
for commercial microwave ovens**

ICS 13.120; 29.020; 97.040.20

Reference number : JIS C 9335-2-90 : 2003 (E)

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Electrical Manufacturers' Association (JEMA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS C 9335-2-90 : 2001** is replaced with this Standard.

This revision has been made based on **IEC 60335-2-90 : 2002** *Household and similar electrical appliances—Safety—Part 2-90 : Particular requirements for commercial microwave ovens* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

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Household and similar electrical appliances—Safety—Part 2-90 : Particular requirements for commercial microwave ovens

Introduction This Japanese Industrial Standard has been prepared based on **IEC 60335-2-90** *Household and similar electrical appliances—Safety—Part 2-90 : Particular requirements for commercial microwave ovens* published in 2002 as the second edition with some modifications of the technical contents and to be read together with **JIS C 9335-1 : 2003** *Household and similar electrical appliances—Safety—Part 1 : General requirements*.

Portions underlined with dots are the matters in which the contents of the original International Standard have been modified. The list of modifications with the explanations is given in Annex 1 (informative).

1 Scope This Standard deals with the safety of microwave ovens intended for commercial use, their rated voltage being not more than 250 V for single-phase appliances and 480 V for other appliances.

Appliances covered by this Standard incorporate a door for user access to the cavity.

NOTE 101 The appliance may be built into a vending machine, in which case **JIS C 9335-2-75** may also be applicable.

NOTE 102 **JIS C 9335-2-36** or **JIS C 9335-2-42** may also be applicable to ovens incorporating conventional heating means.

NOTE 103 Appliances that use non-electrical energy are within the scope of this Standard.

In general, this Standard does not take into account

- the use of appliances by young children or infirm persons without supervision;
- playing with the appliance by young children.

NOTE 104 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
- in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the water work authorities and similar authorities.

NOTE 105 This standard does not apply to

- household microwave ovens including combination microwave ovens (**JIS C 9335-2-25**)
- conveyor-type microwave ovens;
- industrial microwave heating equipment (**IEC 60519-6**)

- appliances for medical purposes (**IEC 60601-1**)
- 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).

NOTE : The International Standard corresponding to this Standard is as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are **IDT** (identical), **MOD** (modified), and **NEQ** (not equivalent) according to **ISO/IEC Guide 21**.

IEC 60335-2-90 : 2002 *Household and similar electrical appliances—Safety—Part 2-90 : Particular requirements for commercial microwave ovens* (**MOD**)

2 Normative references Clause **2** of **JIS C 9335-1** is applicable except as follows.

JIS C 9335-2-36 *Safety of household and similar electrical appliances—Part 2-36 : Particular requirements for commercial electric cooking ranges, ovens, hobs and hob elements*

NOTE : **IEC 60335-2-36 : 1993** *Safety of household and similar electrical appliances—Part 2-36 : Particular requirements for commercial electric cooking ranges, ovens, hobs and hob elements* is equivalent to the said standard.

JIS C 9335-2-42 *Safety of household and similar electrical appliances—Part 2-42 : Particular requirements for commercial electric forced convection ovens, steam cookers and steam-convection ovens*

NOTE : **IEC 60335-2-42 : 1994** *Safety of household and similar electrical appliances—Part 2-42 : Particular requirements for commercial electric forced convection ovens, steam cookers and steam-convection ovens* is equivalent to the said standard.

JIS C 9335-2-75 *Safety of household and similar electrical appliances—Part 2 : Particular requirements for commercial dispensing appliances and vending machines*

NOTE : **IEC 60335-2-75 : 1994** *Safety of household and similar electrical appliances—Part 2-75 : Particular requirements for commercial dispensing appliances and vending machines* is identical with the said standard.

3 Definitions Clause **3** of **JIS C 9335-1** is applicable except as follows. **3.1.7** and **3.1.9** are respecified in this Standard.

3.1.7 rated frequency **3.1.7** of **JIS C 9335-1** is applicable except as follows.

NOTE 101 The rated frequency is the input frequency.

3.1.9 normal operation

operation of the appliance under the following conditions

The appliance is operated with $1\,000\text{ g} \pm 50\text{ g}$ of potable water at an initial temperature of $20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ in a cylindrical borosilicate glass vessel having a maximum thickness of 3 mm and an outside diameter of approximately 190 mm. The vessel is placed on the centre of the shelf. If the rated microwave power output exceeds 2 200 W, two such vessels are used and placed contiguously in the cavity.

3.101 microwave oven

appliance using electromagnetic energy in one or several of the ISM frequency bands between 300 MHz and 30 GHz, for heating food and beverages in a cavity

Information : ISM frequency bands are the electromagnetic frequencies established by the ITU and reproduced in CISPR11.

3.102 rated microwave power output

microwave power output assigned to the appliance by the manufacturer

3.103 cavity

space enclosed by the inner walls and the door in which the load is placed

3.104 shelf

horizontal support in the cavity on which the load is placed

3.105 door interlock

device or system that prevents the operation of the magnetron unless the oven door is closed

3.106 monitored door interlock

door interlock system that incorporates a supervision device

3.107 temperature-sensing probe

device that is inserted into the food to measure its temperature and is a part of an oven control

4 General requirement Clause 4 of **JIS C 9335-1** is applicable.

5 General conditions for the tests Clause 5 of **JIS C 9335-1** is applicable except as follows. **5.2** and **5.3** are specified in this Standard.

5.2 **5.2** of **JIS C 9335-1** is applicable except as follows.

NOTE 101 An additional sample may be required for the test of **19.104**. Six samples of the interlocks are required for the test of **24.1.4**.

5.3 Modification:

Instead of carrying out the tests in the order of clauses, the following sequence of clauses and subclauses applies: **32**, **22.113**, **22.108**, **22.115**, **7** to **17**, **20**, **21** (except **21.101** to **21.105**), **18**, **19** (except **19.104**), **22** (except **22.108**, **22.113** and **22.116**), **23** to **31**, **21.101** to **21.105** and **19.104**.

5.101 Microwave ovens are tested as motor-operated appliances.

5.102 Class III temperature-sensing probes are only subjected to the tests of **22.112**.

6 Classification Clause **6** of **JIS C 9335-1** is applicable except as follows. **6.1** is respecified in this Standard.

6.1 **6.1** of **JIS C 9335-1** is applicable except as follows.

Microwave ovens shall be class 0I or class I.

7 Marking and instructions Clause **7** of **JIS C 9335-1** is applicable except as follows. **7.1**, **7.6**, **7.12** and **7.14** are respecified in this Standard.

7.1 **7.1** of **JIS C 9335-1** is applicable except as follows.

Appliances shall be marked with the nominal frequency in megahertz of the ISM band in which they operate.

If the removal of any cover results in microwave leakage exceeding the value specified in clause **32**, the cover shall be marked with the substance of the following:

WARNING : Microwave energy—Do not remove this cover

If an appliance incorporates a socket-outlet protected by means of fuses other than D-type fuses, it shall be marked with the rated current of the relevant fuse. When a miniature fuse-link is provided, this marking shall indicate that the fuse-link is to have a high breaking capacity.

7.6 **7.6** of **JIS C 9335-1** is applicable except as follows.

Add the following symbol:

 (symbol 5021 of **IEC 60417**) equipotentiality

7.12 **7.12** of **JIS C 9335-1** is applicable except as follows.

The instructions shall include the substance of the following.

- Warning: If the door or door seals are damaged, the oven must not be operated until it has been repaired by a competent person;
- Warning: It is hazardous for anyone other than a competent person to carry out any service or repair operation that involves the removal of any cover which gives protection against exposure to microwave energy;
- Warning: Liquids or other foods must not be heated in sealed containers since they are liable to explode;
- Warning: Microwave heating of beverages can result in delayed eruptive boiling, therefore care must be taken when handling the container;
- Warning: The contents of feeding bottles and baby food jars must be stirred or shaken and the temperature checked before consumption, in order to avoid burns;

- the minimum height of free space necessary above the top surface of the oven;
- only use utensils that are suitable for use in microwave ovens;
- when heating food in plastic or paper containers, keep an eye on the oven due to the possibility of ignition;
- if smoke is observed, switch off or unplug the appliance and keep the door closed in order to stifle any flames;
- eggs in their shell and whole hard-boiled eggs should not be heated in microwave ovens since they may explode even after microwave heating has ended;
- details for cleaning door seals, cavities and adjacent parts;
- the oven should be cleaned regularly and any food deposits removed;
- failure to maintain the oven in a clean condition could lead to deterioration of the surface that could adversely affect the life of the appliance and possibly result in a hazardous situation;
- only use the temperature probe recommended for this oven (for appliances having a facility to use a temperature-sensing probe);
- the appliance should not be cleaned with a water jet (for appliances intended to stand on the floor and which are not at least IPX5).

NOTE 101 If the oven is incorporated in a vending machine, these warnings and instructions may not be relevant and therefore not required.

7.14 7.14 of JIS C 9335-1 is applicable except as follows.

The warning specified in 7.1 shall be in lettering at least 3 mm high.

The warning specified in 7.101 shall be in lettering at least 5 mm high.

7.101 A label shall be provided, together with instructions for fixing it in a conspicuous place close to the appliance. The label shall state the substance of the following.

- Warning: Liquids or other foods must not be heated in sealed containers since they are liable to explode;
- Warning: Microwave heating of beverages can result in delayed eruptive boiling, therefore care must be taken when handling the container;
- Warning: The contents of feeding bottles and baby food jars must be stirred or shaken and the temperature checked before consumption, in order to avoid burns.

Compliance is checked by visual inspection.

8 Protection against access to live parts Clause 8 of JIS C 9335-1 is applicable.

9 Starting of motor-operated appliances Clause 9 of JIS C 9335-1 is not applicable.

10 Power input and current Clause 10 of JIS C 9335-1 is applicable.

11 Heating Clause 11 of JIS C 9335-1 is applicable except as follows. However 11.2, 11.7 and 11.8 are respecified in this Standard.

11.2 11.2 of JIS C 9335-1 is applicable except as follows.

Appliances, other than built-in appliances, are positioned as specified for heating appliances.

A ceiling is placed over the appliance at the minimum height stated in the instructions. The ceiling has a depth of 300 mm from the back wall of the test corner and a length at least 150 mm in excess of the width of the appliance.

Appliances intended to be fixed to the floor, and appliances with a mass greater than 40 kg and not provided with rollers, castors or similar means, are installed in accordance with the installation instructions. If no instructions are supplied, these appliances are placed on the floor as near as possible to the walls of the test corner.

11.7 11.7 of JIS C 9335-1 is applicable except as follows.

Appliances are operated in cycles, each cycle consisting of a heating period of 4 min followed by a rest period of 1 min until steady conditions are established. Boiling water is added to the water load when half of the water load has evaporated.

11.8 11.8 of JIS C 9335-1 is applicable except as follows.

The temperature rises of external surfaces are only measured on the surfaces that are not placed against the wall and the floor of the test corner.

There are no temperature limits for air-outlet grilles and for surfaces up to a distance of 25 mm from them.

12 Void

13 Leakage current and electric strength at operating temperature Clause 13 of JIS C 9335-1 is applicable.

14 Transient overvoltages Clause 14 of JIS C 9335-1 is applicable.

15 Moisture resistance Clause 15 of JIS C 9335-1 is applicable except as follows. 15.2 is additionally respecified in this Standard.

15.2 15.2 of JIS C 9335-1 is applicable except as follows.

A quantity of 0.5 L of water containing approximately 1 % NaCl is poured steadily over the shelf over a period of 1 min. If the shelf can collect spilled liquid, it is filled with the saline solution and a further 0.5 L is then added over a period of 1 min.

15.101 Temperature-sensing probes shall be constructed so that their insulation is not affected by water.

Compliance is checked by the following test.