

STANDARDS UPDATE NOTICE (SUN) ISSUED: May 21, 2024

STANDARD INFORMATION

Standard: CSA E60335-2-25

Standard ID: Household and Similar Electrical Appliances - Safety - Part 2-25: Particular Requirements

for Microwave Ovens, Including Combination Microwave Ovens [CSA E60335-2-25:2023 Ed.3] **Previous Standard ID:** Safety of Household and Similar Electrical Appliances - Part 2: Particular

Requirements for Microwave Ovens (R2021) [CSA E60335-2-25:2001 Ed.1]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: June 1, 2025

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard. Reports not updated to this version by the effective date above will be withdrawn.

CSA E60335-2-25 is to be used in conjunction with 2nd edition of CSA C22.2 No. 60335-1.

Overview of Changes: New requirements for simultaneous activation of heating elements and motors. Specific details of new/revised requirements are found in table below.

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
	·	
1		Scope
		This clause of Part 1 is replaced by the following.
		This part of IEC 60335 deals with the safety of microwave ovens for household and similar use, their rated voltage being not more than 250 V.
		This standard also deals with combination microwave ovens, for which Annex AA is applicable.
		This standard also deals with microwave ovens intended to be used on board ships, for which Annex BB is applicable.
6	Info	Classification
6.1		Microwave ovens shall be class I or class II.
7	Info	Markings and instructions
		New clause added;
7.1		The input to a cord-connected appliance intended for use on nominal 120 V branch circuit protected by overcurrent devices rated or set at not more than 15 A shall not exceed 1500 W at 120 V.
		New clause added;
		Appliances shall be provided with the following warning sign, which shall be in two contrasting colours and shall be clearly visible and identifiable from a distance of 1 m:
		CAUTION — MICROWAVES and
7.1A		ATTENTION — MICRO-ONDES
		20 mm (minimum)



CLAUSE VERDICT COMMENT

New clause added;

The instructions shall state the substance of the following:

IMPORTANT SAFETY INSTRUCTIONS READ CAREFULLY AND KEEP FOR FUTURE REFERENCE

The instructions shall include the substance of the following warnings:

- 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 a cover which gives protection against exposure to microwave energy.
- WARNING: Liquids and other foods must not be heated in sealed containers since they are liable to explode.

The instructions shall include the substance of the following:

- This appliance is intended to be used in household and similar applications such as:
 - staff kitchen areas in shops, offices and other working environments;
 - farm houses;
 - by clients in hotels, motels and other residential environments;
 - bed and breakfast type environments.

If the manufacturer wishes to limit the use of the appliance to less than the above, this has to be clearly stated in the instructions.

- 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.
- Metallic containers for food and beverages are not allowed during microwave cooking. This requirement is not applicable if the manufacturer specifies size and shape of metallic containers suitable for microwave cooking.
- When heating food in plastic or paper containers, keep an eye on the oven due to the possibility of ignition.
- The microwave oven is intended for heating food and beverages. Drying of food or clothing and heating of warming pads, slippers, sponges, damp cloth and similar may lead to risk of injury, ignition or fire.
- If smoke is observed, switch off or unplug the appliance and keep the door closed in order to stifle any flames.
- Microwave heating of beverages can result in delayed eruptive boiling, therefore care must be taken when handling the container.
- The contents of feeding bottles and baby food jars shall be stirred or shaken and the temperature checked before consumption, in order to avoid burns.

7.12



CLAUSE	VERDICT	COMMENT
CLAUSE	VERDICT	 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 instructions for use for fixed appliances and built-in appliances being used equal or higher than 900 mm above the floor and having detachable turntables shall state that care should be taken not to displace the turntable when removing containers from the appliance. This is not applicable for appliances with horizontal bottom hinged door. The appliance shall not be cleaned with a steam cleaner. The manufacturer shall state in the instructions whether the microwave oven is intended to be used freestanding, built-in or in a cabinet. If the appliance can be used while placed in a cabinet, the minimum dimensions of the cabinet shall be given by the manufacturer, and the instructions shall state that the appliance must be operated with any cabinet door open. The instructions for microwave ovens having an additional decorative door shall state that the appliance must be operated with the decorative door open.
		The instructions for microwave ovens that are not tested in a cabinet shall state that the appliance must not be placed in a cabinet. The instructions for microwave ovens that are not in compliance with 22.118 shall state that the appliance must not be installed equal or higher than 900 mm above
		the floor.
8	Info	Protection against access to live parts
		New clause added;
8.1.1		Test probe 18 of IEC 61032 is also applied, as specified for test probe B. However, it is only applied to parts that are accessible when the oven is operated in normal use.
		New clause added;
8.2		Test probe 18 of IEC 61032 is also applied, as specified for test probe B. However, it is only applied to parts that are accessible when the oven is operated in normal use.



CLAUSE	VERDICT	COMMENT
11	Info	Heating
		New clause added;
		Appliances, other than built-in appliances, are positioned as specified for heating appliances.
11.2		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 that can be used when placed in a cabinet are placed in a cabinet with the minimum dimension given in the instructions by the manufacturer, the plywood specified for the test corner being used. The appliance is positioned against the rear wall and one of the side walls.
		The cabinet door is in the open position.
		New clause added;
11.7		Appliances are operated for three cycles, each cycle consisting of a heating period of 10 min followed by a rest period of 1 min. The last cycle does not include a rest period of 1 min. During the rest periods, the door is open, and the load is replaced.
		New clause added;
11.8		The temperature rises of external surfaces of microwave ovens are only measured on the surfaces that are not placed against the wall and the floor of the test corner.
11.0		There are no temperature rise limits for air-outlet grilles and for surfaces up to a distance of 25 mm from them.
		NOTE 101 These surfaces do not include handles.
15	Info	Moisture resistance
		New clause added;
		Microwave ovens intended to be built-in as underbench installation and therefore subject to spillage of liquid from containers onto working surfaces shall be constructed so that such spillage does not affect their electrical insulation.
15.102		Compliance is checked by the following test (see Figure 102).
		The microwave oven is built-in as underbench installation as specified by the manufacturer. The test cabinet including the working surface is tilted to an angle of 2° in the most unfavourable direction. 500 ml of water containing approximately 1 % NaCl and approximately 0,6 % acid rinsing agent is poured steadily over a period of 20 s through a funnel onto the complete width of the working surface above the microwave oven. The funnel has an outlet diameter of approximately 8



CLAUSE VERDICT COMMENT mm and the lower edge of its outlet is positioned 20 mm above the working surface. The centre of the funnel is positioned 15 mm inwards from the leading edge of the working surface. The leading edge of the working surface shall be rounded with a radius of 25 mm and the working surface shall be 50 mm in thickness and free of any drain slots, drain edges, tearing edges and similar. Immediately after the test, the appliance shall withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on insulation that could result in a reduction of clearances or creepage distances below the values specified in Clause 29. The composition of the water containing approximately 1 % NaCl and approximately 0,6 % acid rinsing agent is described in Annex AA of IEC 60335-2-5:2012. New clause added; Microwave ovens intended to be built-in in cabinets underneath other built-in appliances and therefore subject to spillage of liquid from filled containers which are handled during usage of these other appliances shall be constructed so that such spillage does not affect their electrical insulation. Compliance is checked by the following test (see Figure 103). The microwave oven is built-in as specified by the manufacturer. The test cabinet is tilted to an angle of 2° in the most unfavourable direction. 200 ml of water containing approximately 1 % NaCl and approximately 0,6 % acid rinsing agent is poured steadily over a period of 8 s through a funnel onto the complete width of the separation board above the microwave oven. The funnel has an outlet 15.103 diameter of approximately 8 mm and the lower edge of its outlet is positioned 20 mm above the separation board. The centre of the funnel is positioned 15 mm inwards from the leading edge of the separation board. If the manufacturer states in the installation instructions that a separation board above the microwave oven is not required, the test shall be repeated while pouring the water containing approximately 1 % NaCl and approximately 0,6 % acid rinsing agent directly onto the complete width of the top surface of the microwave oven. The lower edge of the funnel outlet is positioned 20 mm above the top surface of the microwave oven and its centre is positioned 15 mm inwards from the leading edge of the microwave oven.

Immediately after the test, the appliance shall withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on insulation that



CLAUSE	VERDICT	COMMENT
		could result in a reduction of clearances or creepage distances below the values specified in Clause 29.
		The composition of the water containing approximately 1 % NaCl and approximately 0,6 % acid rinsing agent is described in Annex AA of IEC 60335-2-5:2012.
16	Info	Leakage current and electric strength
		New clause added;
16.101.1		The insulation between the primary and secondary windings of switch-mode power supply transformers is subjected for 1 min to a voltage of substantially sinusoidal waveform and having a frequency of 50 Hz or 60 Hz. The value of the voltage is 1,414 times the peak value of the secondary working voltage plus 750 V, with a minimum of 1 250 V.
		There shall be no breakdown between windings or between adjacent turns of the same winding.
		This clause of Part 1 is replaced by the following.
		The door system, including hinges, microwave seals and other associated parts, shall be constructed to withstand wear that may be expected in normal use.
		Compliance is checked by the following test.
18		The door system is subjected to $\frac{10 \cdot 000}{50 \cdot 000}$ cycles of operation with the appliance supplied at rated voltage and containing an appropriate microwave-absorbing load. It is then subjected to $\frac{10 \cdot 000}{50 \cdot 000}$ cycles of operation without microwave generation.
		The door is opened and closed as in normal use. It is opened from the closed position to a position approximately 10° before fully open. The rate of operation is 6 cycles per minute. With the agreement of the manufacturer, the rate of operation without microwave generation can be increased to 12 cycles per minute.
		After the test, the microwave leakage shall not exceed the limit specified in Clause 32 and the door system shall still function.
19	Info	Abnormal operation
		New clause added;
19.101		Appliances are operated with controls set at the most unfavourable position and without load in the cavity.
		The period of operation is the maximum time allowed by the timer or until steady conditions are established, whichever is shorter.
		D = 54=



CLAUSE	VERDICT	COMMENT
		If microwave leakage exceeds 100 W/m2 the following alternative measurement method shall be applied, which modifies the microwave leakage limit of 19.13. In order to identify and mark all spots where peak values of microwave leakage exceeds 100 W/m2, the instrument antenna is moved again over the external surface of the appliance, particular attention being given to the door and its seals.
		NOTE 1 A peak hold function of the measurement instrument, if any, can be activated for identification of spots where peak values of microwave leakage exceeds 100 W/m2.
		The leakage values of each such spot shall be recorded and the averaged leakage value of any spot over the most onerous 20 seconds shall not exceed 100 W/m2. Furthermore, the peak value shall not exceed 500 W/m2.
		New clause added;
19.105		Built-in appliances having an additional decorative door and appliances to be used in a cabinet are operated under normal operation but with the decorative door or cabinet door closed.
		The period of operation is the maximum time allowed by the timer or until steady conditions are established, whichever is shorter.
		New clause added;
		Appliances shall be subjected to the following test, except those where the waveguide is sealed to prevent moisture or food debris.
19.105A		A countertop microwave oven shall be supported on a softwood surface, covered with a double layer of white tissue paper and draped loosely with a single layer (double thickness) of cheesecloth over the whole oven, with the cheesecloth within 3 mm of all openings in the enclosure, except for those openings located so that the draped cheesecloth will not lie on or hang over them. Under-cabinet and over-the-range ovens shall be mounted according to the manufacturer's instructions.
		A mixture of 15 g peanut butter, 8 g water, 10 g chicken broth, 8 g salt, and 2 g finely crushed carbonized wood (charcoal/carbon powder) shall be well mixed and applied evenly to the inside surface of the waveguide cover. Once applied, the waveguide cover shall be replaced to the position of normal operation.
		The appliance shall be operated at full microwave power without load for 7 h for the maximum cycle period or until ultimate results are obtained, whichever occurs first. In the case of an appliance with a heater element, operation shall be representative of the most severe condition that could be encountered during intended use, consistent with the highest microwave power setting.



CLAUSE	VERDICT	COMMENT
		This test shall be repeated on the stirrer on models that also contain a stirrer. As a result of the test, there shall be no fire hazard as evidenced by glowing or flaming of the cheesecloth, tissue paper, or the softwood surface. Clause 19.13
		does not apply. New clause added;
		Thermally protected motors shall be subjected to the following test unless they are totally enclosed in metal or 5VA material.
19.105B		All motor thermal protectors shall be shunted out of the motor winding so that the motor stays continually energized. The motor shall be equipped with a thermocouple for measurement of winding temperatures. The rotor shall be locked. The motor, including fan blade, shall be mounted as intended in application and shall be energized in a room ambient temperature of 10 to 40 °C.
		A countertop microwave oven shall be supported on a softwood surface, covered with a double layer of white tissue paper and draped loosely with a single layer (double thickness) of cheesecloth over the whole oven, with the cheesecloth within 3 mm of all openings in the enclosure, except for those openings located so that the draped cheesecloth will not lie on or hang over them. Under-cabinet and over-the-range ovens shall be mounted according to the manufacturer's instructions.
		The motor shall be energized at the rated voltage separately from the microwave oven and operated until the winding temperature stabilizes. The voltage shall be increased in 10 V increments, allowing the winding temperature to stabilize after each increase in voltage. Operation shall continue until ultimate results are obtained. As a result of the test, there shall be no fire hazard as evidenced by glowing or flaming of the cheesecloth, tissue paper, or the softwood surface. Clause 19.13 does not apply.
22	Info	Construction
22.103.2		New clause added; Appliances shall incorporate two independent monitored door interlocks that are operated by opening the door. In this case, 22.105 is not applicable.
		Compliance is checked by inspection and the following test.
		The door is slowly opened and, simultaneously, an attempt is made to manually defeat any accessible door interlock by test probe B one at a time.
		During the tests, the operation of the magnetron shall not be possible.



CLAUSE	VERDICT	COMMENT
	•	New clause added;
22.104		At least one door interlock of 22.103.1 and both monitored door interlocks of 22.103.2 shall incorporate a switch that disconnects the microwave generator or its supply main circuit.
		Compliance is checked by inspection.
		New clause added;
		There shall be no undue microwave leakage, and the temperature-sensing probe shall not become damaged when a probe or its cord is trapped by the door. Compliance is checked by the following test.
22.112		The probe is connected as in normal use, the sensing part or cord being allowed to rest in the most unfavourable position likely to occur. The door is closed against the sensing part or the cord with a force of 90 N applied for 5 s in the most unfavourable place. The force is then released and, if the oven can be operated with the temperature-sensing probe still being placed in the trapped position, the microwave leakage is measured under the conditions specified in Clause 32 and shall not exceed 100 W/m2.
		After the test, the appliance shall comply with Clause 32 and the temperature-sensing probe shall comply with 8.1, 15.101 and Clause 29.
		New clause added;
		Appliances for installing in road vehicles, caravans and similar vehicles shall withstand the vibrations to which they may be subjected.
22.116		Compliance is checked by carrying out the vibration tests specified in IEC 60068-2-6 under the following conditions.
		The appliance is fastened in its normal position of use to a vibration-generator by means of straps around the enclosure. The type of vibration is sinusoidal, and the severity is as follows:
		 the direction of vibration is vertical; the amplitude of vibration is 0,35 mm; the sweep frequency range is 10 Hz to 55 Hz; the duration of the test is 30 min.
		The appliance shall show no damage that could impair compliance with 8.1, 16.3 and Clauses 29 and 32, and connections shall not have worked loose.



CLAUSE	VERDICT	COMMENT
22.117		New clause added;
		If electronic circuits are used to provide protection against microwave leakage they shall be designed so that a fault condition will not affect protection against microwave leakage.
		Compliance is checked by applying the tests in Clause 19 in conjunction with the requirements and test specifications in 22.105, 22.106, 22.107 and 22.108.
		New clause added;
		Inadvertent operations during handling of the container during normal use of fixed appliances and built-in appliances being used equal or higher than 900 mm above the floor having detachable turntables shall not lead to a hazardous situation due to falling down turntables. This is not applicable for appliances with horizontal bottom hinged door.
		Compliance is checked by inspection and the following test.
22.118		The bearing of the detachable turntable of microwave ovens shall be placed in the most unfavourable position. A force which will be increased from 0 N up to the maximum of 10 N is applied vertically downwards to the front edge of the turntable.
		During the test, the turntable shall not slide out of the cavity and fall down.
		A cylindrical container of borosilicate glass with a maximum thickness of 3 mm, an external diameter of approximately 190 mm, a height of approximately 90 mm and an outer bottom curvature of approximately 5 mm is filled with 1 000 g \pm 50 g cold water and placed on the turntable. With a horizontal force applied at the top of the container which will be increased from 0 N up to the maximum of 10 N an attempt is made to pull the container out of the cavity without any lifting from the turntable.
		During the test, the turntable shall not slide out of the cavity and fall down.
		New section added;
22.119		Outer glass panels of microwave oven doors which break during the test of 21.104 and with an area having any two orthogonal dimensions exceeding 75 mm shall be made from:
		See standard for details.



CLAUSE	VERDICT	COMMENT
		New clause added;
22.120		Where interlocks are required to comply with this standard and are operated by detachable parts they shall be guarded so that accidental operation is prevented.
		Compliance is checked by inspection and by manual test with test probe B.
		New clause added;
		For appliances that are controlled by programmable electronic circuits that limit the number of heating elements and motors from being energised at the same time, simultaneous activation of any combination of heating elements and motors shall not render the appliance unsafe.
22.121		Compliance is checked as follows:
22,121		 the fault/error conditions specified in Table R.1 are applied and evaluated in accordance with the relevant requirements of Annex R; or the appliance is operated under conditions of Clause 11 while being supplied at rated voltage, the programmable electronic circuits being modified to allow simultaneous activation of all heaters and motors under their control.
		Under these conditions, compliance with 19.13 shall be fulfilled.
		New clause added;
22.121A		Edison-base lampholders shall be prevented from turning by means other than friction. Screwshells of lampholders shall be connected to the identified conductor.
		New clause added;
22.121B		Openings for ventilation or other purposes shall not be located directly beneath an electrical component that will produce molten metal or burning material in any failure mode, unless the component is thermally protected or is so enclosed or baffled that molten metal or burning material cannot fall through to the supporting surface.
25	Info	Supply connection and external flexible cords
25.7		New clause added; Cord-connected appliances shall be provided with a permanently attached supply cord, Type SJ, SJT, HSJO, HPN (if 14 AWG), or SPT3 or equivalent, not less than 1 m long, with a grounding-type attachment plug complying with the requirements of CSA C22.2 No. 21. Flexible cords for cord-connected appliances shall have a current rating at least equal to the maximum input, in amperes, under normal operating conditions.



CLAUSE	VERDICT	COMMENT
30	Info	Resistance to heat and fire
		New clause added;
30.2A		Polymeric materials for enclosures shall comply with the flammability requirements for 5VA materials as specified in CSA C22.2 No. 0.17.
		Compliance for microwave leakage is checked by the following test.
		A load of 275 g \pm 15 g of potable water having a temperature of 20 °C \pm 2 °C, in a thin-wall borosilicate glass vessel having an inside diameter of approximately 85 mm, is placed on the centre of the shelf. The appliance is supplied at rated voltage and operated with the microwave power control at the highest setting.
32		Microwave leakage is determined by measuring the microwave flux density using an instrument that reaches 90 $\%$ of its steady reading in 2 s to 3 s when subjected to a stepped input signal.
		The instrument antenna is moved over the external surface of the appliance to locate the highest microwave leakage, particular attention being given to the door and its seals.
		The microwave leakage at any point 50 mm or more from the external surface of the appliance shall not exceed $\frac{50}{1.0}$ W/m2.
		New clause added;
		If the high voltage in the oven exceeds 10 kV peak when operated normally, there shall be a measurement for X-radiation as follows.
		The X-radiation from a microwave oven shall be measured at any external location 50 mm from the external surface of the oven under the following conditions:
32.1A		 a) The equipment shall be complete, except that mechanical parts which need to be removed during servicing of the microwave oven may be omitted if they are not i) necessary for the functioning of the appliance; ii) exposed to view during normal operation; and iii) held captive by a chain, hinge, or loose rivet.
		b) A water load of 1 to 3 L in a container made of an electrically nonconductive material approximately 220 mm diameter and 110 mm high shall be placed in the approximate centre of the oven shelf. This water load shall be replaced at the end of the cooking cycle, or as necessary.
		c) Any adjustable user or service control affecting X-radiation shall be adjusted to obtain maximum X-radiation.
		The intensity of X-rays emitted by an oven shall not exceed 0.5 mR/h averaged over an area of 1000 mm2.



CLAUSE	VERDICT	COMMENT
		When the generation of X-rays within a microwave oven exceeds 2.5 mR/h averaged over 1000 mm2 while operated under the above-mentioned conditions, the warning sign described in Clause 7.1A shall be permanently marked on the microwave power-generating component where it is most clearly visible when the oven is being serviced.
		Combination microwave ovens
Annex AA		For stationary combination microwave ovens, IEC 60335-2-6 is also applicable. <u>For portable combination microwave ovens, IEC 60335-2-9 is also applicable.</u> However, the requirements of these standards do not take precedence over this standard.
AA.5	Info	General conditions for the tests
A A F 404		New clause added;
AA.5.101		Combination microwave ovens are tested as combined appliances.
AA.7	Info	Marking and instructions
		New clause added;
AA.7.12		The instructions for use shall also include the substance of the following.
		WARNING: When the appliance is operated in the combination mode, children should only use the oven under adult supervision due to the temperatures generated.
AA.11		Heating
		New clause added;
		Microwave ovens having a grill that can be operated simultaneously with microwave generation are operated for 30 min, the microwave power output being approximately 50 %.
AA.11.7		Microwave ovens having convection heating that can be operated simultaneously with microwave generation are operated for 60 min, the microwave power output being approximately 50 %.
		Microwave ovens having a grill or convection heating that can be operated sequentially with microwave generation are operated for 15 min with the microwave power output control adjusted to the highest setting, followed by 30 min of operation without microwave generation.
		If more than half the water evaporates during the test, the vessel is refilled with boiling water, the door not being opened for more than 10 s.



CLAUSE	VERDICT	COMMENT
		New clause added;
		Endurance
AA.18		Before measuring the microwave leakage, the following additional conditioning is carried out:
		 resistive heating elements for radiant heating are operated for 15 min; resistive heating elements for convection heating are operated for 30 min; pyrolytic self-cleaning ovens are operated for one cleaning cycle.
		New clause added;
AA.19		Abnormal operation
		The test of 19.102 is carried out with the appliance supplied at 1,06 times rated voltage.
		New clause added;
22		Construction
		Subclause 22.120 of IEC 60335-2-6:2014 is not applicable.
29	Info	Clearances, creepage distances and solid insulation
		New clause added;
29.2		 the insulation is exposed to exhaust air from the oven cavity, in which case pollution degree 3 applies.
		New clause added;
29.3		There are no thickness requirements for sheaths of visibly glowing heating elements if the door interlocks provide all-pole disconnection.
		New annex added;
		Microwave ovens intended to be used on board ships
Annex BB		The following modifications to this standard are applicable for microwave ovens intended to be used on board ships.
		See standard for details.