The structure of the microwave oven and the notes when using the microwave oven

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Microwave is a specially designed device that uses microwaves to cook or reheat food, so you need to be careful when using a microwave oven for cooking. Currently, the microwave oven is a widely used appliance in the kitchen, but it is not an ordinary cooking appliance like other electric stoves or pots. Therefore, users need to know and understand the principles of use to ensure the safety of themselves and these devices.

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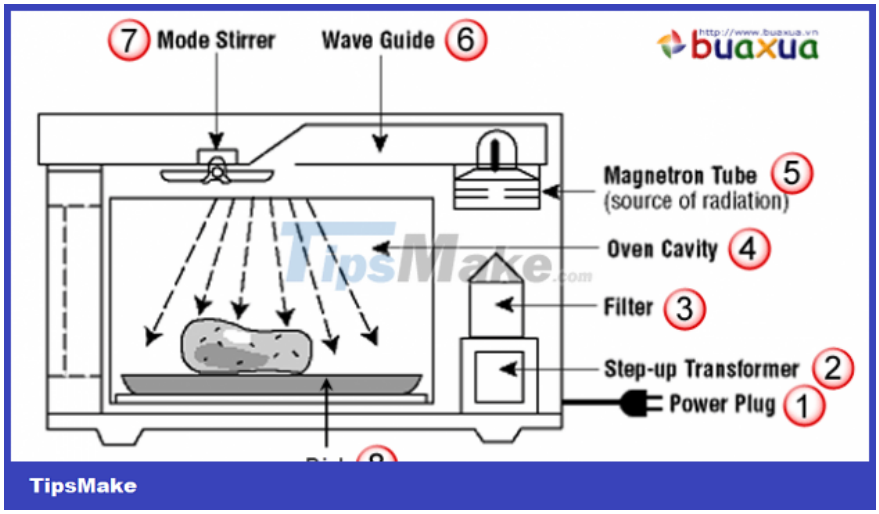
Structure and working principle of microwave oven



Structure and working principle of microwave oven

1. Power cord.
2. Frequency converter.
3. Filter.
4. Cooking compartment.
5. Magnetron (broadcast light)
6. Waveguides
7. Wave inverter.
8. Plates for food.

Microwave, also known as microwave oven, is a specially designed device that uses microwaves to cook or reheat food. Microwaves are generated from the Magnetron source, are guided by the waveguide, into the cooking compartment and then reflected back and forth between the walls of the cooking compartment, and absorbed by the food. Microwaves in a microwave oven are oscillations of an electromagnetic field with a frequency usually at 2450 MHz - a wavelength of about 12.24cm.

Food molecules including water, fats, sugars, and other organic matter are usually in the form of electrical dipoles - with one end negatively charged and the other positively charged. These electric dipoles tend to rotate so that they lie parallel to the direction of the external electric field. When the electric field oscillates, the molecules are rapidly rotated back and forth. Rotational vibrations are converted into chaotic thermal motion through molecular collisions, heating the food.

Microwaves at 2450 MHz effectively heat liquid water, but not fat, sugar, and ice. This heating is sometimes confused with resonance with the specific oscillation of water, however in reality the resonance occurs at higher frequencies, in the range of a few tens of GHz. Molecules of glass, some plastics or paper are also difficult to heat up by microwaves at 2450 MHz. As a result, food can be stored in utensils made of the above materials in a microwave oven, with only the food being cooked.

The cooking compartment is a Faraday cage consisting of metal or metal mesh surrounding it, ensuring that the waves do not escape. Metal mesh is often observed in the microwave oven door. The holes in this mesh are much smaller than the wavelength of 12cm, so microwaves don't get through, but light at much shorter wavelengths can still pass through, helping to see the food inside.

With respect to metals or electrical conductors, electrons or charge carriers located in these objects are especially mobile, and easily oscillate rapidly in response to changes in the electromagnetic field. They can create an

electric image of the source of the wave, create a strong electric field between the conductor and the power source, which can cause sparks to discharge between the image and the source, with the risk of fire and explosion.

Notes on using microwaves to cook food

1. Do not allow children to approach or use the microwave oven.
2. Do not put metal objects or dishes with metal decorations in the microwave oven, to avoid the risk of explosion due to spark discharge.
3. Use specialized food containers for microwave ovens; Do not use conventional plastic discs.
4. Do not operate the oven when there is no food or water in the oven; waves that are not absorbed by the food will continue to be reflected back and forth and destroy the oven. Should regularly keep a glass of water in the oven, because if the user does not know and turns on the oven, it is still safe.
5. Food with shell or thin film, the internal volume when heated will increase pressure, easy to cause food to explode. Need to tattoo holes, peel off to avoid this phenomenon. Do not boil eggs, shellfish. still closed.
6. If the oven is dropped or flattened, it must be checked to see if the oven door is open. The food compartment must ensure "tightness" for microwaves so that the waves do not escape.
7. When cooking in the microwave, check for even cooking. Intestinal-causing Salmonella bacteria have been detected in some microwaved bare eggs, due to the uneven heat distribution.
8. Some toxins, which can cause dangerous diseases such as cancer, from plastic packaging and label printing such as adipate, Phtalate, and Benzophenone can be transferred to food cooked in microwave ovens. Therefore, it is necessary to separate the packaging from the food before putting it in the oven.
9. Do not use the microwave to cook marinated pork or smoked pork loin. These foods are high in nitrites. If heated in a microwave, nitrites will become nitrosamines - molecules that can cause cancer very strongly.
10. For microwave ovens with a grill function, absolutely do not use ordinary metal grills, but only use specially made grills that come with the oven.