FACT SHEET

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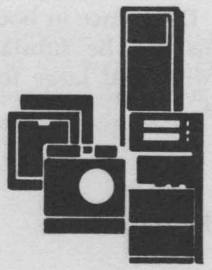

MICROWAVE APPLIANCES

Janice Garrett*

Microwave appliances offer some alternative choices in selecting a standard range. The microwave appliances are used primarily to *supplement* conventional ranges. Although the microwave appliances can cook faster and cooler than a conventional range (for example, you can bake a potato in 5 minutes compared to 40–45 minutes in a conventional oven), it cannot take the place of a conventional range since some foods cannot be prepared well in them. Microwave cooking is a new way of preparing foods requiring the cook to learn a new approach to food preparation. Cooking is controlled by *time,* not *temperature.*

The Microwave

A microwave is nonionizing, meaning it is a form of energy which causes a rise in temperature rather than a chemical change. Food is heated or cooked by absorbing microwave energy.

Construction

The principal parts of most microwave appliances are the magnetron, antenna, wave guide, stirrer and glass plate. These parts are completely enclosed in a metal box with a tight door and an enclosed cooking cavity.

The magnetron is the device that makes the microwaves. The waves are caused to vibrate and are discharged by the antenna into the wave guide. The waves entering the cooking cavity through the wave guide are stirred around by the stirrer which diffuses the waves in all directions thoughout the cooking cavity. The glass shelf on the bottom of the cooking cavity is about 1½ inches from the

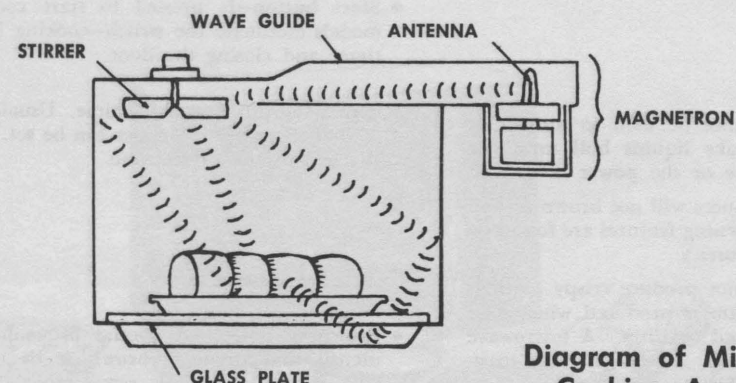

Diagram of Microwave Cooking Appliance

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bottom so that the waves can get under the food. A filter is used to collect grease and a vent to let steam and moisture out during cooking.

Cooking Method

The method of cooking used in the microwave appliance differs from the conventional method. Microwaves heat neither the air nor the oven, as in the conventional method, but penetrate the food where the microwave energy vibrates and generates sufficient friction and heat to cook some items in seconds.

Loss of nutritional content and flavor of foods is at a minimum in the microwave appliance, since little or no water is used when cooking. Foods evenly distributed or spread out in the cooking utensil use energy most efficiently, and the food is heated or cooked uniformly.

Nonmetallic cooking utensils, such as ovenproof glass, chinaware, ceramics, paper and heat-tolerable plastic can be used in a microwave appliance since they allow the microwaves to pass through the utensils. (Some metallic utensils are not suitable since microwaves bounce off them; however, some manufacturers condone the use of TV dinner trays and aluminum foil since these are quite thin and do not interfere substantially with microwave distribution.) Both the cooking cavity and the utensils remain cool, making cleanup simple since food splatters do not bake on in the cooking cavity or on the utensil. Food can be covered loosely with waxed paper or a paper towel to prevent splatters. When cooking larger items that require a longer time in the microwave appliance, some heat from the food can be transferred to the utensil. A potholder may be needed to remove these items after cooking.

Cooking Limitations

- Most microwave appliances cannot be used to simmer or stew. The microwaves will make liquids boil until the food has lost all of its moisture or the power is cut off.
- Foods in some microwave appliances will not brown as well as in conventional cooking. Browning features are found on some models. (See special features.)
- The microwave appliance will not produce crispy coatings on foods or crust on pies. Steam is produced when food is heated and wets the crusts and coatings. A microwave appliance also will not fry or broil. It can grill and toast, but it is tricky and not very effective.
- Large cuts of meat may not be as tender as when cooked conventionally.
- For best cooking results when using a microwave appliance, follow manufacturer's directions closely until you are able to judge cooking times for yourself.

Size

Microwave cooking appliances come in portable (countertop) and free-standing styles. Some manufcturers have also incorporated microwaves into conventional ranges. The space available in the kitchen will determine what size or kind of appliance is selected. Difference in both the outside and inside dimensions can be substantial. Check to see if the oven will hold large food items such as roasts or turkeys.

Frequency and Power

Most microwave appliances operate on a frequency of 2,450 megahertz, (MH_Z = million cycles per second). This is a relatively short wavelength and is sufficient in cooking normal-sized food items. Some also operate on a frequency of 915 MH_Z, a longer wavelength for deeper penetration of larger food items. Portable microwave appliances plug into ordinary 110–120-volt household circuits, but a large, free-standing one will require its own 220-volt line. Because cooking time is so much shorter when using a microwave appliance, it costs less to operate than a conventional range.

Operating Features

- **Interlocks**—Turns off the energy as soon as the door is opened. All microwave appliances must have at least two operating safety interlocks. Some models also use special energy-absorbing material around the door.
- **Signal**—A buzzer or light indicates when set cooking time is over.
- **Start button**—Is pressed to start cooking action. Some models eliminate the switch—cooking begins by setting the timer and closing the door.
- **Timer**—Regulates cooking time. Usually marked in seconds so that short heating cycles can be set. The energy stops at the end of the preset time.

Special Features

- **Browning devices**—A special browning unit or a special utensil that produces browning by capturing microwave heat is available with some models. If the microwave appliance you select does not have this feature, foods can be browned in a conventional oven after being cooked in the microwave appliance. The initial cost of the microwave appliance will be higher with the browning feature, but it is more economical and convenient than using two appliances to cook one food item.

- **Automatic defroster**—Switches power on and off every 30 seconds to achieve even thawing. Without this feature, microwave appliances have the tendency to overdo the outside of foods and leave the inside icy.

Guarantees and Warranties

A microwave appliance is usually guaranteed for two years. Read the warranty carefully. Make sure there is a competent dealer in your area who can service microwave equipment.

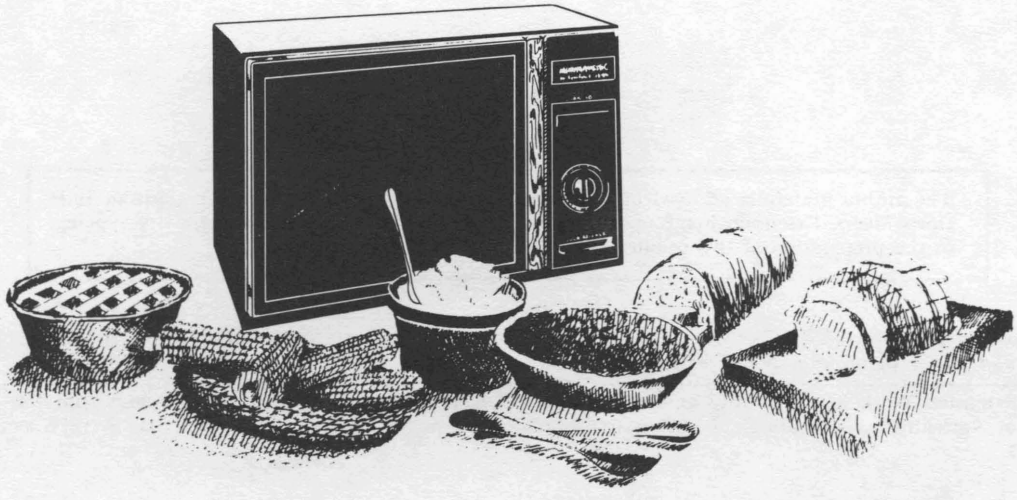
Safety

- Microwave appliances are made with the safety of the consumer in mind.
- Regulations protect the user from unnecessary exposure to microwave energy. Every microwave appliance must be equipped with at least two operating safety interlocks that will automatically shut off radiation when the oven door is opened.
- Look for the seal of the Underwriters' Laboratories, which test microwave appliances for leakage as well as for the effects of shipment damage.
- When using a microwave appliance, follow the manufacturer's operating instructions carefully. Proper use of the microwave appliance assures maximum safety to the user. Follow these basic recommendations established by the Bureau of Radiological Health:
  - Examine for evidence of shipping damage.
  - Never insert objects (for example, a wire) through the door grill or around door seal.
  - Never tamper with or inactivate the oven safety interlocks.
  - Never operate when empty.
  - Frequently clean cooking cavity, door, seals and filter with water and mild detergent. Do not use scouring pads, steel wood or other abrasives.
  - Have appliance checked regularly by a qualified serviceman for signs of wear, damage or tampering.
  - Switch control to "off" before opening the door.
  - Stay at least an arm's length away from the front of the appliance while it is on.
  - If you wear a pacemaker, consult a physician before purchasing a microwave appliance.

Before Calling a Repairman

If your microwave appliance will not operate, check these points:

- Magnetron tube overheated (unit designed to shut off until cool; extremely small amount of food in oven might not absorb enough energy and could cause magnetron tube to overheat. Suggestion: when cooking small amounts of food, place a glass container filled with water in the cooking cavity to absorb unused microwaves).
- Filter dirty or greasy.
- Oven door not properly closed.
- Timer not set.
- Circuit breaker tripped (use of another appliance on same circuit may blow fuse or trip breaker).
- "On" button not pushed.



The following Extension fact sheets discuss selection, use and care of home appliances.

L-1139 Selection, Use and Care of Major Home Appliances

L-1168 Refrigerators and Freezers

L-1179 Decisions about Dishwashers

L-1180 Washers

L-1181 Dryers

L-1182 Disposers and Compacters

L-1240 Ranges

L-1241 Microwave Appliances

These are available from your county Extension office.

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