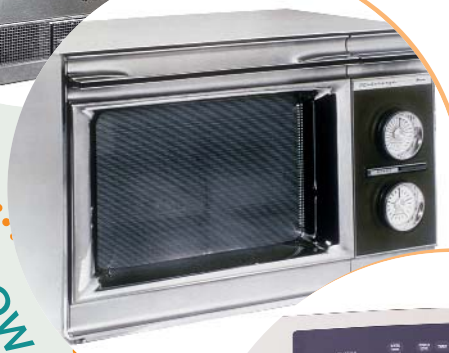
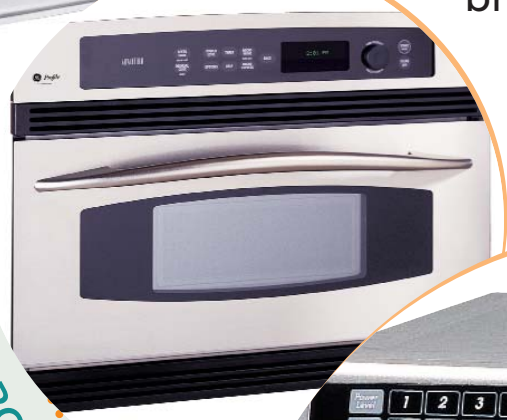
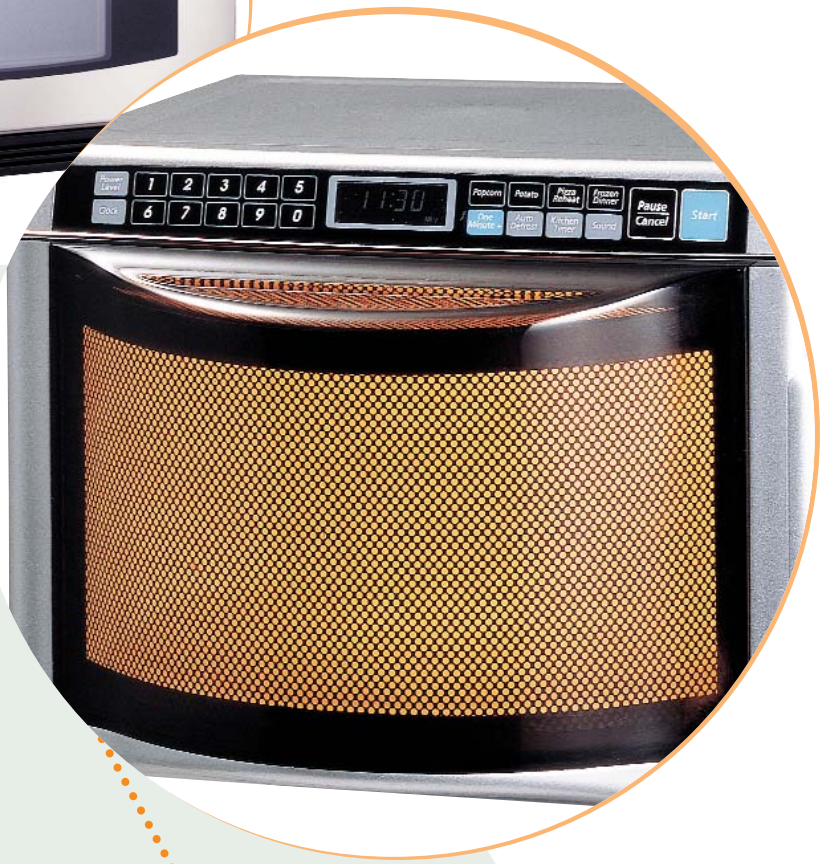
What's New in Microwave Ovens

Technological breakthroughs let you fine-tune the heat so that you can soften ice cream or brown a chicken

BY ROE A. OSBORN







MICROWAVE COOKING THROUGH THE YEARS

1947
First microwave oven used for testing

1955
Tappan makes the first commercial microwave oven

1967
Amana's Radarange: first microwave oven for the home

1998
GE's Advantium combines microwaves with halogen

2003
The box breaks down as Samsung's microwave oven gets round

In 1946, **Percy Spencer** discovered the cooking properties of microwaves. In 1967, Amana launched the first microwave oven for the home. By 1975, microwave ovens were outselling gas ranges.

Top two photos, photo of Percy Spencer: Courtesy of Spencer Family Archives

THINKING OUTSIDE THE BOX

In 1946, Percy Spencer, a brilliant engineer with Raytheon, was testing a new vacuum tube called a magnetron when he noticed that a candy bar in his pocket had melted. Curious, Spencer then put a few kernels of popcorn near the tube, and they popped almost immediately. Microwave cooking had been discovered.

A year later, the first microwave oven was made for testing (photos facing page). Not exactly a kitchen-friendly appliance, this first microwave was 5½ ft. tall and weighed more than 750 lb. The tube got so hot that it needed a water-cooled radiator to keep it under control.

Lighter-weight air-cooled models soon followed, and microwave ovens continued to evolve until 1967, when the first microwave oven for the home was introduced. As they say, the rest is history. By 1975, sales of microwave ovens exceeded sales of gas ranges. Today, it's tough to find a kitchen without one of these handy appliances.

How microwaves cook

Microwaves in an oven tend to be distributed in specific and not necessarily even patterns, which is why microwaved food can be overcooked on the outside and cold in the middle. The first upgrade to the basic microwave box is a carousel that rotates food for a more even exposure to microwaves.

Almost every microwave maker offers a carousel model. The drawback is the square-peg-in-a-round-hole issue: Carousels are round, and most cookware is rectangular. Cookware has to fit in the confines of the carousel's diameter. Two companies, LG (Lucky Goldstar) and Samsung, have introduced microwave ovens with round cavities that allow for larger carousels, increasing usable capacity. Samsung's version sports a round door (top photo). LG's solution to the carousel dilemma is Glide and Cook: A tray in the bottom of the oven moves side to side instead of rotating (center photo).

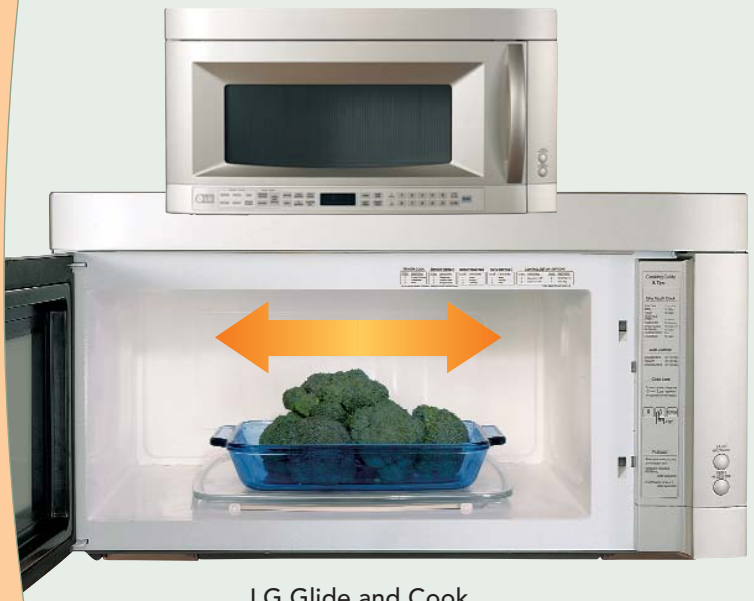
The alternative to moving the food in the oven is to move the microwaves themselves. Many companies, including Whirlpool and GE, offer models with stirrers that act like fans to distribute microwaves through the oven cavity. LG claims that its Intellowave system essentially converts the microwave pattern from 2-D to 3-D.

Location, location, location

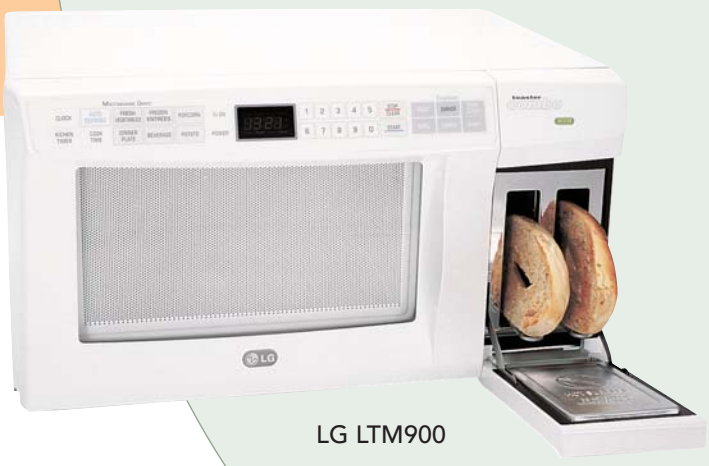
To save valuable counter space, many companies offer over-the-counter (OTC) models, including Sharp, Sam-

Microwave ovens have come a long way from the boxes that sat on kitchen countertops in the 1970s. Some models hang under wall cabinets to free counter space; others double as range hoods. Microwave ovens have advanced inside as well. LG and Samsung make models with round oven cavities that have the capacity of a 1-cu.-ft. oven in a fraction of the space. The **Samsung MD800SC** (top photo) sports a round door for the larger carousel. The **LG Glide and Cook** (center photos) moves food side to side instead of rotating it. The **LG LTM900** models have a built-in toaster (bottom photo).

Samsung MD800SC



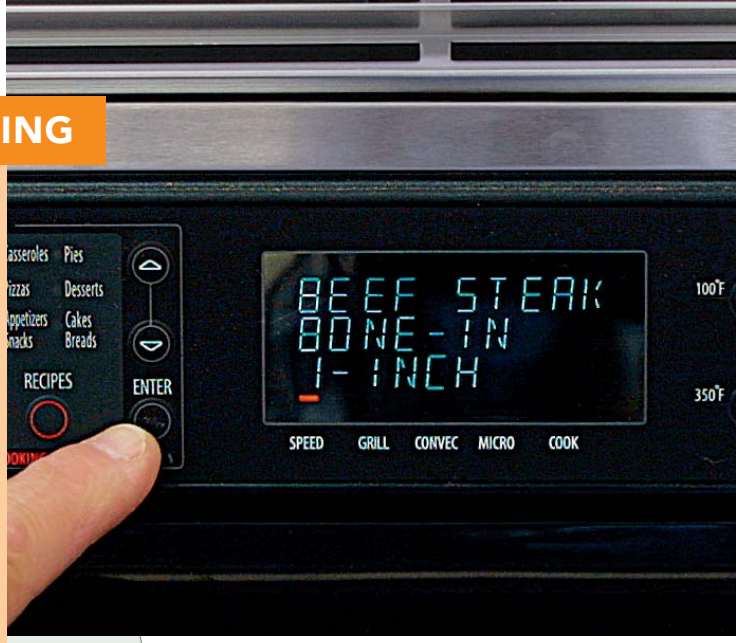
LG Glide and Cook



LG LTM900

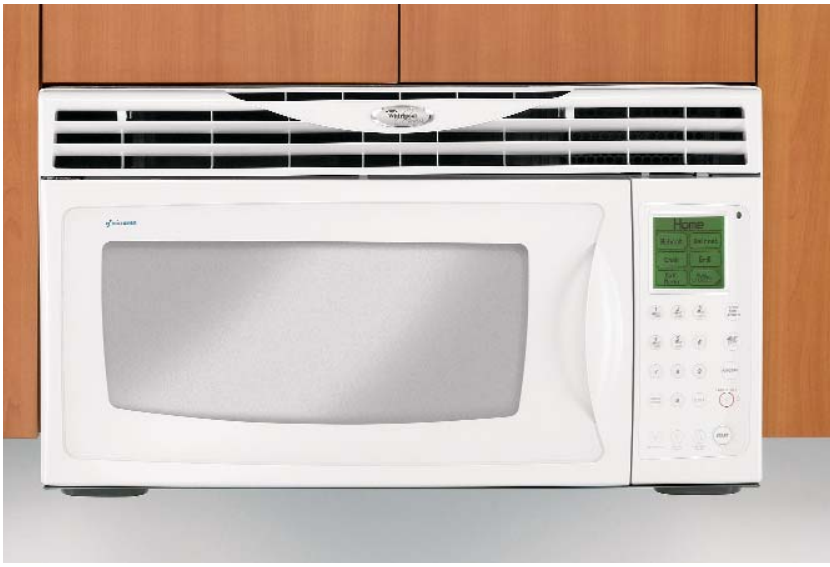
FOR SERIOUS COOKING

The first commercial microwave oven made by Tappan in 1955 came with regular elements for browning food. But the desire for fast cooking soon outweighed the appearance of food, and heating elements were abandoned for home models. Recently, though, new systems have been combined with microwaves for speedy cooking with chef-quality results.

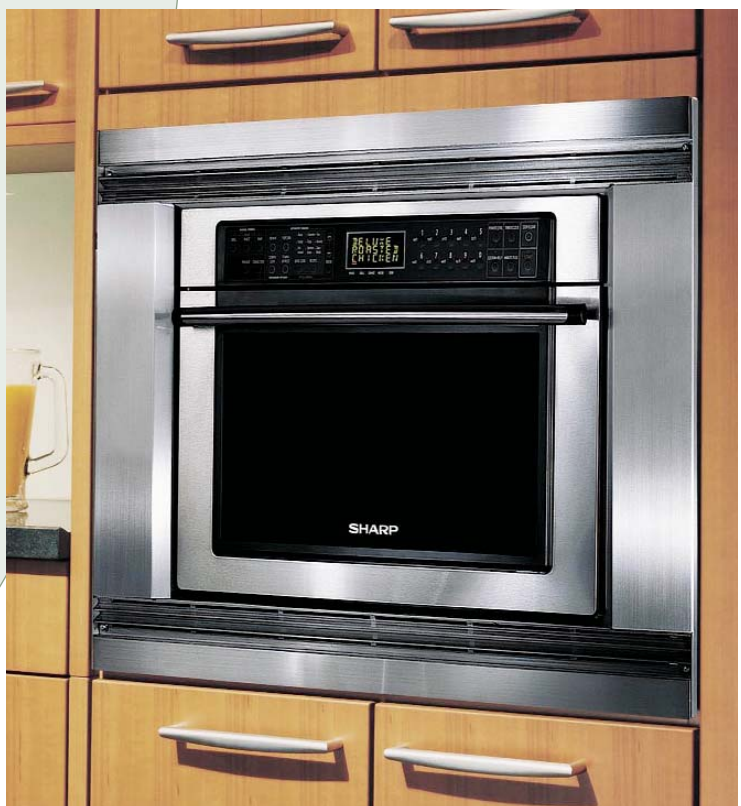


Believe what you see. *Microwave ovens are not just for popping popcorn or making coffee. These powerhouses can bake or broil like regular ovens in a fraction of the time.*

Cooking at the speed of light. *Like a beefed-up cousin of those old Easy-Bake ovens, GE's Advantium combines halogen light with microwaves to cook food up to 8 times faster than a regular oven.*



Three times the cooking power. *The Whirlpool G² cooking system combines halogen for grilling heat, quartz for penetrating heat, and microwaves for speeding the cooking process.*



The convection advantage. *Convection ovens cook faster than conventional ovens, and Sharp's R90GC speed-cooking system combines high-velocity convection with a microwave assist for fast cooking with professional results.*

Top photo this page: Roe A. Osborn

sung, and GE. This type of microwave oven usually comes in 27-in. and 30-in. widths and is designed to be built in with cabinets to the top and sides.

The most popular place to install a microwave is over the range (OTR). Like OTC models, OTR ovens are built into the cabinetry, only above a range or cooktop. OTR microwave ovens double as range hoods to exhaust cooking odors and vapors from the stove. Like many range hoods, though, OTR microwave ovens aren't as deep as the typical range, so cooking odors and vapors from the front burners can escape into the kitchen. Samsung's SMH7155 unit has a vent that extends at the push of a button to cover the front burners.

Are you a zapper?

The next factor when deciding which microwave oven is right for you is how you use yours. Microwave-oven users fall into two categories: zappers and cookers.

Zappers use microwave ovens for things like making popcorn, warming coffee, or reheating leftovers. For these folks, a small basic microwave with few bells and whistles will do just fine.

These plain ovens come as countertop, OTC, or OTR models, but I'd think twice about devoting the space to an OTC or OTR model if a small countertop model would fill your microwave needs. GE's SpaceSaver model is a simple microwave oven made to fit under wall cabinetry without taking up a lot of space.

Microwave ovens for chefs

If you plan to use your microwave oven as a full-fledged cooking tool (don't laugh), I suggest looking into a model that combines microwave speed with standard features found in regular ovens, such as convection and broiling. Many manufacturers have created cooking systems that work in conjunction with microwaves to give you the most cooking bang for the microwave-oven real-estate buck. These small ovens brown, sear, or broil food just like larger ovens, but they do the cooking with the added speed of microwaves.

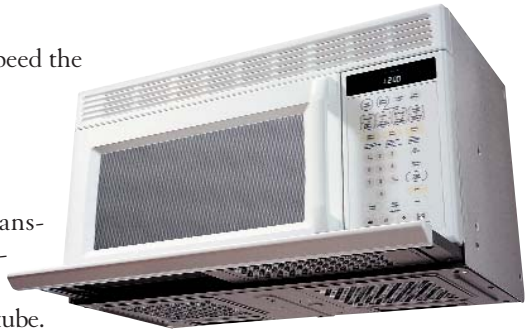
The granddaddy of all these systems is GE's Advantium (photo center left, facing page). Advantium combines the heat source of halogen with microwaves to let you cook eight times faster than a normal oven (with 240 volts) or four times as fast (with 120 volts). Cooking with light is nothing new. The folks at GE describe Advantium as a space-age version of the old Easy-Bake ovens that you played with as a kid.

Sharp's high-speed oven (model R90GC) combines high-speed convection from a resistance element with microwave assist (bottom photo, facing page). Samsung's SpeedCook uses microwaves in conjunction with a grilling element and convection. Whirlpool's G^2 system combines quartz, halogen, and microwaves (photo center right, facing page). The halogen provides grilling heat, quartz provides penetrating heat, and microwaves speed the cooking process.

Inverters gives you better control

Most microwave ovens use a transformer to convert ordinary household current to the high voltage needed to power the magnetron tube. Transformers have been around for decades. They're heavy and are controlled with switches similar to those on most electric stove burners (*FHB* #127, pp. 90-95). With a transformer system, the power level to the oven is always full; the switch just varies the time that the oven cycles on and off. A common result of the transformer problem is thawing meat that stays frozen on the inside but has begun to cook on the outside.

Enter inverter technology. Lighter-weight inverters allow you to control and adjust the power-output level of



Going the extra mile, or at least 6 inches. *There are many microwave ovens that double as range hoods, but Samsung's SMH7155 model sports a slide-out vent.*

Risks with microwave ovens

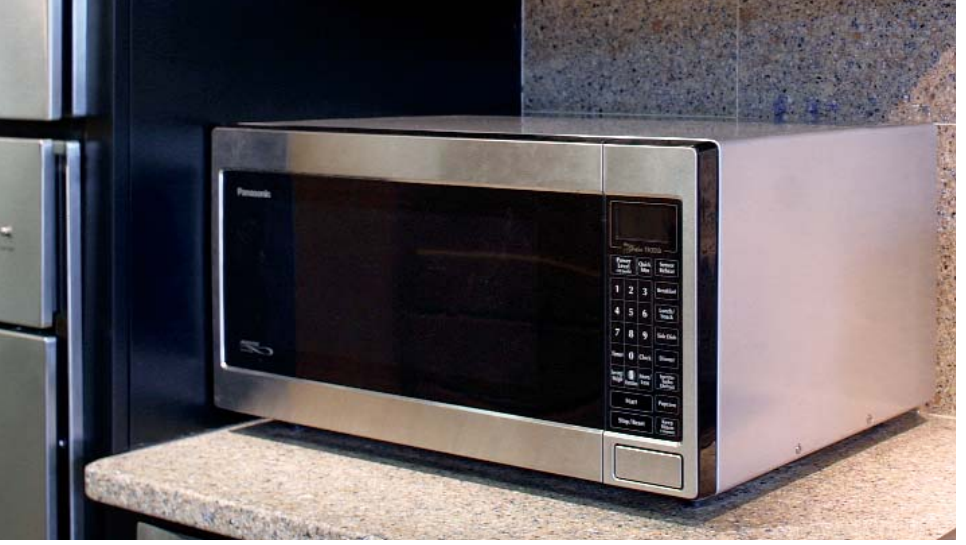
We've all heard stories about eggs and potatoes exploding in microwave ovens. Those stories are true because as the food cooks, pressure inside the skin builds. If the skin is as hard as an eggshell, the pressure can build quite high before the skin breaks and the egg explodes.

Arcs are those miniature lightning bolts that occur when microwaves are caught between two metal objects. The metal racks found in many microwave ovens won't cause arcing by themselves, but metal such as a fork or a crumpled piece of foil placed near the rack or oven wall can cause arcing. Even the gold rim of a china cup can cause arcing, so make sure the cookware you use is microwave safe. Another source of arcing is the buildup of certain foods, such as tomato, on the walls of a microwave oven—a good argument for keeping your oven clean at all times. When arcing occurs, turn off the oven immediately to prevent damage.

Another danger with microwave ovens is superheated water. If water is placed in a smooth container in a microwave oven, it can be heated well past its boiling point, yet remain still. When an object (a spoon, a teabag, some grains of sugar) disrupts the surface tension, the water boils violently in a small explosion that can cause severe injury. So always follow the oven instructions for heating or reheating water, and if there is a chance that water has become superheated, let it cool at least a full minute before handling the cup.

Along with a host of other electronic devices, the energy generated by a microwave oven can cause a cardiac pacemaker to malfunction.

One misconception is that microwave ovens give off harmful radiation. The radiation from a microwave oven is no more dangerous than radiation from a television.



Inverters give you more control. *Instead of just turning full power on and off, inverter technology lets you dial down the oven's output, which eases tasks such as softening ice cream.*

the magnetron tube from 10% to 100% in 10% increments. Instead of cycling, the tube stays on to generate microwaves continuously, only at a lower power level. At the 10% setting, you can keep the gravy warm while the turkey finishes cooking, or you can soften ice cream without melting it. Microwave ovens with inverters (photo above) are more energy efficient, and inverters make the tube last longer. Inverter technology also allows more cooking power with a 15-amp circuit. Although no company uses inverters in all their microwave ovens, inverter models are available from Panasonic, KitchenAid (Optima Plus), LG (Smartwave), and Whirlpool (AccuWave).

Microwave ovens that do math

Many microwave ovens use sensors as part of their controls. Sensors detect levels of moisture in the air inside the oven. When the food has given off a sufficient amount of moisture, the oven shuts off, sort of like the high-tech clothes dryers that shut off when the clothes "feel" dry.

For these sensors to do their job, manufacturers program them with hundreds of complex algorithms. The sensors have to know the difference between popcorn and a lamb chop. They also have to know the difference between one ½-lb. chop and a plateful, as well as the difference between medium rare and medium well done. When you consider the combinations and permutations of different ways to cook different foods, microwave ovens with sensors have to be really smart machines.

Computer-age controls

The array of microwave-oven controls is staggering. Touch pads are far and away the most common (top photo, p. 62). But as these ovens become complicated with features such as convection/bake, convection/broil, and sensor cooking, to name a few, making sense of the controls becomes daunting.

The easiest controls I've seen use computer-screen menus that you scroll through to adjust the microwave oven to your exact cooking situation. GE's Advantium system uses a dial to get you through the choices. Their Spacemaker ovens have a condensed touch screen that was very intuitive even for a nongeek like me. The folks at LG describe their Scroll and Cook touch-screen controls as "microwave ovens for dummies." Regardless of your computer prowess, though, I suggest making sure you're comfortable with the controls before you write the check.

The bottom line

Even though microwave-oven technology was discovered and developed in America, most appliances are now made overseas by just a handful of companies. That said, virtually every appliance company markets microwave ovens that are made exclusively for them, often with exclusive features. So if your kitchen is, say, all Jenn-Air or Viking, you'll be able to buy a microwave oven to match, but you pay the price for the brand name.

There seems to be little rhyme or reason to microwave-oven pricing. Prices vary wildly without consideration of features and without even the shiny dressing of a stainless-steel exterior. Dozens of basic countertop microwave ovens—even ones with inverter technology—are available for less than $100. OTC and OTR microwave ovens increase the price as well.

As you add features like convection or other speed-cooking options, the price climbs. Now put all that in a designer package, and you could be paying $1,500 or more for your microwave oven. One option that some high-end companies offer is a double oven with a microwave oven on top. The door on the KitchenAid version even folds down like a conventional oven door. □

Roe A. Osborn is a senior editor with *Fine Homebuilding*. Photos courtesy of manufacturers, except where noted.

SOURCES

Amana
800-843-0304
www.amana.com

General Electric
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www.jennair.com

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