exhausted, which means the door may be opened at any time without danger of scalding or burning as with a pressure steamer. Cooks use convection steamers to cook large quantities of food.

- **Pressure steamer**: A pressure steamer cooks foods with high-pressure steam. Water is heated under pressure in a sealed compartment, allowing it to reach temperatures greater than 212°F. It's very important to release the pressure before opening the door on a pressure steamer. The cooking time is controlled by automatic timers, which open the exhaust valves at the end of the cooking time to vent the steamer.
- **Steam-jacketed kettle**: These kettles come in free-standing and tabletop versions and in a very wide range of sizes. The kettle's bottom and sides have two layers, and steam circulates between the layers, heating liquid foods like soups and stews quickly and evenly. Because the circulating steam evenly heats all sides of the kettle instead of just the bottom, food cooks faster and more evenly and is less likely to burn.
- **Tilting fry pan**: Although this piece of equipment is often called a fry pan or skillet, cooks use it to grill, steam, braise, sauté, and stew many different kinds of food. Most tilting fry pans have lids that allow the unit to function as a steamer. They are very easy to clean.

Broilers

There are several types of broilers that cooks commonly use in restaurant and foodservice operations. Using very intense direct heat, broilers cook food quickly. For broilers, the heat source is above the food. Here are a few of the broilers most commonly found in restaurant and foodservice operations. Figure 5.13 shows the broilers used in a professional kitchen.

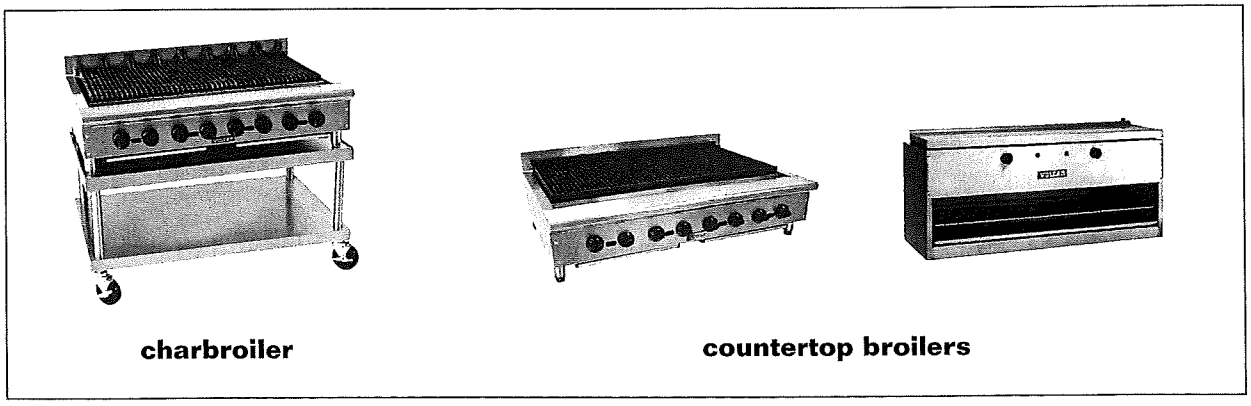


Figure 5.13: Broilers used in professional kitchens.

- **Charbroiler**: Charbroilers use gas or electricity to mimic the effects of charcoal in a grill. Food juices drip onto the heat source to create flames and smoke, which adds flavor to broiled foods.
- **Countertop broiler**: This is a small broiler that sits on top of a work table. Primarily quick-service restaurants use these. The heat source is located above the food and produces an intense radiant heat.
- **Hotel broiler**: Use this large radiant broiler to broil large amounts of food quickly.
- **Rotisserie** (roe-TIS-er-ee): In a rotisserie, cooks place food on a stick, or spit, and roast it over or under a heat source. The unit may be open or enclosed like an oven. Cooks use it most often for cooking chicken, turkey, and other types of poultry.
- **Salamander**: This is a small radiant broiler usually attached to the back of a range. Use it to brown, finish, and melt foods to order.

Ranges, Griddles, and Fryers

In restaurant and foodservice kitchens, the range is usually the most frequently utilized piece of equipment. **Ranges** are cooking units with open heat sources. Like much of the restaurant and foodservice equipment mentioned earlier, ranges come in multiple sizes and variations suitable to the specific needs of an individual operation. Figure 5.14 shows the different types of ranges used in a professional kitchen.

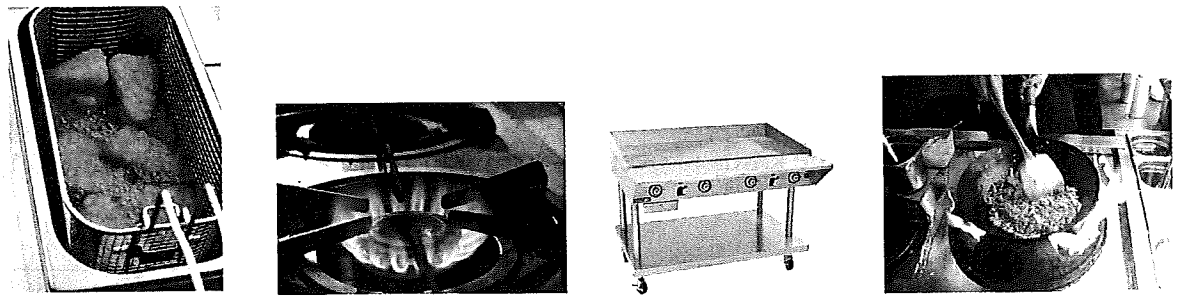


Figure 5.14: Ranges used in professional kitchens.

- **Deep-fat fryer**: Gas and electric fryers cook foods in oil at temperatures between 300°F and 400°F. Some computerized fryers lower and raise the food baskets automatically.
- **Flat-top burner (also called a French top)**: A flat-top burner cooks food on a thick slate of cast iron or a steel plate that covers the heat source. A flat-top burner provides even and consistent heat.
- **Griddle**: Similar to a flat-top range, a griddle has a heat source located beneath a thick plate of metal. Cook foods directly on this surface, which is usually designed with edges to contain the food and a drain to collect waste.
- **Induction burner**: An induction burner generates heat by means of magnetic attraction between the cooktop and a steel or cast-iron pot or pan. The cooktop itself remains cool. Reaction time is significantly faster with the induction cooktop than with traditional burners. Do not use copper or aluminum pans on this burner. They will not work.
- **Open burner**: A grate-style gas burner supplies direct heat by way of an open flame to the item being cooked. The heat can be easily controlled.
- **Ring-top burner**: With a ring-top burner, cooks add or remove different-sized rings or plates to allow more or less heat to cook the food item. A ring-top burner provides direct, controllable heat. It can be either gas or electric.
- **Wok burner**: This is a gas burner (or propane for home use) with multiple jets, designed to cradle a rounded wok pan in extremely intense heat. The high heat of a wok burner produces the *wok hey,* which is a particularly savory, charred flavor associated with the best wok-cooked dishes.

Ovens

There are many types of ovens available to suit a variety of restaurant and foodservice operations. They vary in size and method of operation. Following are just a few of the kinds of ovens you might find in an operation. Figure 5.15 shows the different types of ovens used in a professional kitchen.

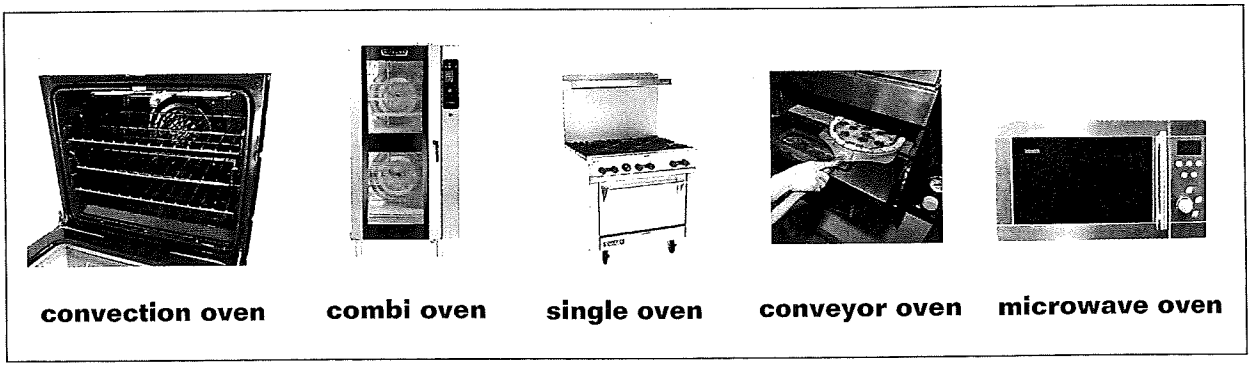


Figure 5.15: Ovens used in professional kitchens.

- **Convection oven**: Convection ovens have a fan that circulates heated air around the food as it cooks. This shortens cooking times and uses energy efficiently. Reduce recipe temperatures designed for conventional ovens by 25 to 50 degrees, because the circulating air is so much more efficient.
- **Combi-oven**: This unit combines a convection oven with a steamer. Using a combi-oven, cooks can work with convective steam, with convective dry hot air, or with a combination of both. These are very efficient, flexible units, but they are relatively expensive.
- **Conventional (standard) oven**: In a conventional oven, the heat source is located on the floor of the oven. Heat rises into the cavity, or open space in the oven, which contains racks for the food to sit on as it cooks. These ovens are usually located below a range-top burner. Conventional ovens are inexpensive and easy to integrate with other pieces of cooking equipment.
- **Conveyor** (con-VAY-er) **oven**: In this type of oven, a conveyor belt moves the food along a belt in one direction. It cooks with heat sources on both top and bottom.
- **Deck oven**: A deck oven is a type of conventional oven in which two to four shelves are stacked on top of each other. Cook food directly on these shelves, or decks.
- **Microwave oven**: Microwave ovens heat food not with heat, but with microwaves of energy that cause a food's molecules to move rapidly and create heat inside the food. In restaurant and foodservice kitchens, cooks use microwaves mainly to thaw and reheat foods.
- **Rotary oven**: A rotary oven has three to five circular shelves on which food cooks as the shelves move around a central rod.
- **Slow-roasting oven**: Use this oven to roast meats at low temperatures. This helps preserve the meat's moisture, reduce shrinkage, and brown its surfaces.
- **Smoker**: Use a smoker for smoking and slow-cooking foods. A true smoker treats foods with smoke and operates at either cool or hot temperatures. Smokers generally have racks or hooks, allowing food to smoke evenly.
- **Tandoori oven**: This is a cylindrical or barrel-shaped oven, often made of clay, with a wood or charcoal fire inside at the base and an open top. Food can be thrust inside the oven on long metal spikes (famously, chicken), or portions of thin dough can be slapped against the inside of the oven to develop characteristic bubbling and charring. These ovens easily reach 800°–900°F.

Safety Precautions

When working with large equipment, observe safety precautions. It is important to perform proper and consistent maintenance and cleaning. Follow these guidelines when working with large equipment:

1. Learn to use the machines safely by getting proper instruction and reading the manufacturer's instructions.
2. Use all safety features—make sure that lids are secure, use hand guards, and make sure machines are stable.
3. Turn off and unplug electrical equipment completely after each use.
4. Clean and sanitize the equipment thoroughly after each use.
5. Reassemble all pieces of equipment properly, and leave machines unplugged after each use.
6. Report any problems or malfunctions promptly, and alert coworkers to the problem.

[on the job]

Child Labor

Child labor laws, enforced by the U.S. Department of Labor and the Occupational Safety and Health Administration, govern the working conditions of minors (people under the age of 18). Where these employees are concerned, an important safety regulation in restaurant and foodservice establishments involves some common kitchen equipment.

The Fair Labor Standards Act prohibits minors from using or cleaning any power-driven slicing, mixing, or cutting machines in the workplace. These include meat slicers, vertical choppers, and power mixers. Using this equipment is considered hazardous work. Even with a parent's or guardian's permission, minors may not operate these machines, and employers and supervisors may not allow minors to use them. Typically, prohibited machines will bear stickers or other warnings as a reminder of the potential hazard.

Additional rules apply to 14- and 15-year-olds. These employees are prohibited from certain classes of work, including baking, cooking (unless no open flame is used and, in the case of deep-fryers, the frying baskets are mechanically raised and lowered into the hot oil), and working in freezers or meat coolers.

Holding and Serving Equipment

Once the food arrives in the holding and service area, it is usually ready to be presented to the guest. Everyone in the kitchen has taken all care and precautions to ensure that the meals served to guests have been prepared accurately and with care.

Though most of the hard work in preparing a meal has already been done, the final touches made in the holding and service areas are important to delivering a quality meal. Figure 5.16 shows the different types of holding and serving equipment.

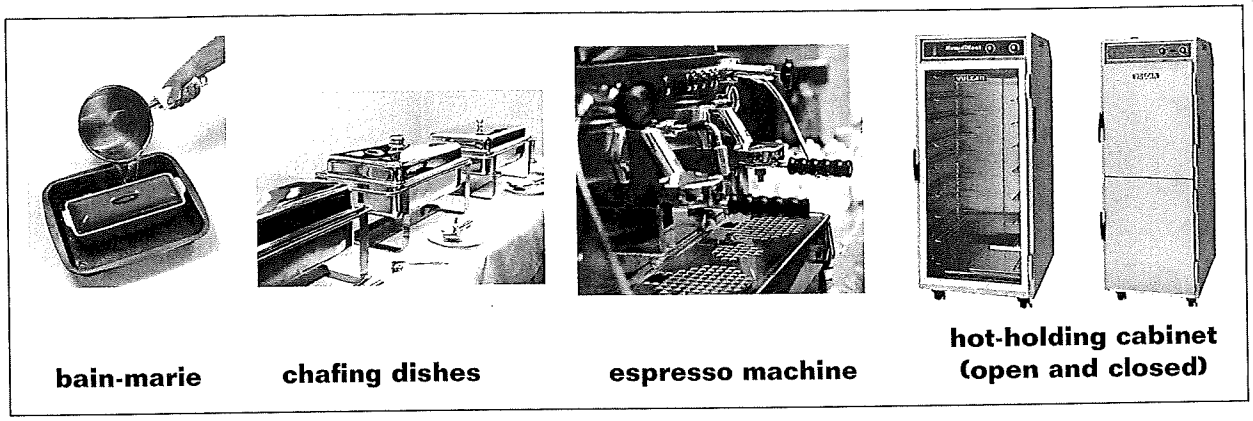


Figure 5.16: Holding and serving equipment used in professional kitchens.

- **Bain-marie** (bayn mah-REE): A bain-marie is any type of hot-water bath meant to keep foods warm. Place food in stainless steel inserts, such as hotel pans, and then place the inserts in a container holding hot water. Inserts come in many sizes, ranging from 1 quart to 36 quarts. A bain-marie, when set properly, holds food at 135°F. Never use it to cook or reheat foods.
- **Carbonated beverage machine**: This machine is attached to tanks that hold the premixed blends for selected soft drinks and to a tank that contains CO_2. When a cook or server presses the switch on the unit, it automatically mixes the blend and gas to make the completed beverage. The unit contains a refrigeration unit to chill the lines to reduce foaming in the dispensed beverage.
- **Chafing dishes**: Use chafing dishes to keep food items hot on a buffet table. Typically, the heat source for chafers are Sternos, which are placed underneath the chafers filled with hot water.
- **Coffee maker**: A coffee maker is a machine that automatically makes coffee. The operator adds coffee and, because the unit is usually connected to a water supply, simply pushes a button to make the coffee. The units come in a variety of sizes, from ones that make a single 12-cup pot to the large banquet-size urns that make 100+ cups.

[fast fact]

Did You Know...?

Coffee is the world's most popular stimulant. The United States consumes more than 400 million cups of coffee daily. Four out of five Americans drink coffee. Some sources note that green coffee is the second-most-traded commodity in the world. And crude oil is the first!

- **Espresso machine**: This machine produces the traditional Italian coffee beverage called espresso. Espresso is a concentrated cofee beverage brewed by forcing hot water under pressure through finely ground coffee.
- **Food warmer or steam table**: This unit differs from the bain-marie in two ways. The unit is designed to hold hotel pans, either one full-size pan or multiple smaller pans per slot. Different types of units are designed to work with water in the holding unit, without water, or either way. A food warmer/steam table, when set properly, holds food at 135°F. Never use it to cook or reheat foods.
- **Hot box**: This is an insulated piece of equipment designed to hold sheet pans and hotel pans.
- **Hot-holding cabinet:** The hot-holding cabinet is a heavily insulated cabinet designed to hold either hotel pans or sheet pans on racks in the interior. A thermostat controls the temperature, so that the cabinet holds food at the desired temperature. Often these units also have controls for humidity to prevent stored foods from drying out. Some units have wheels to make it easy to move them to the service area.
- **Ice machine**: Ice machines make ice cubes, flakes, and chips, and crushed ice. Always scoop ice with a proper ice scoop.
- **Tea maker**: This works the same as the coffee maker, but it makes tea for iced tea.
- **Speed racks**: These racks are generally made of metal and have slots that foodhandlers can slide sheet pans into. This can create shelves of various heights, depending on need. Speed racks, equipped with wheels, are suitable for kitchens, bakeshops, dry storage, refrigerators, and freezers. A wider variant is made to hold large serving trays for banquets, so that cooks can make plates up in advance and store them (for instance, composed salads can be assembled and stored without dressing).

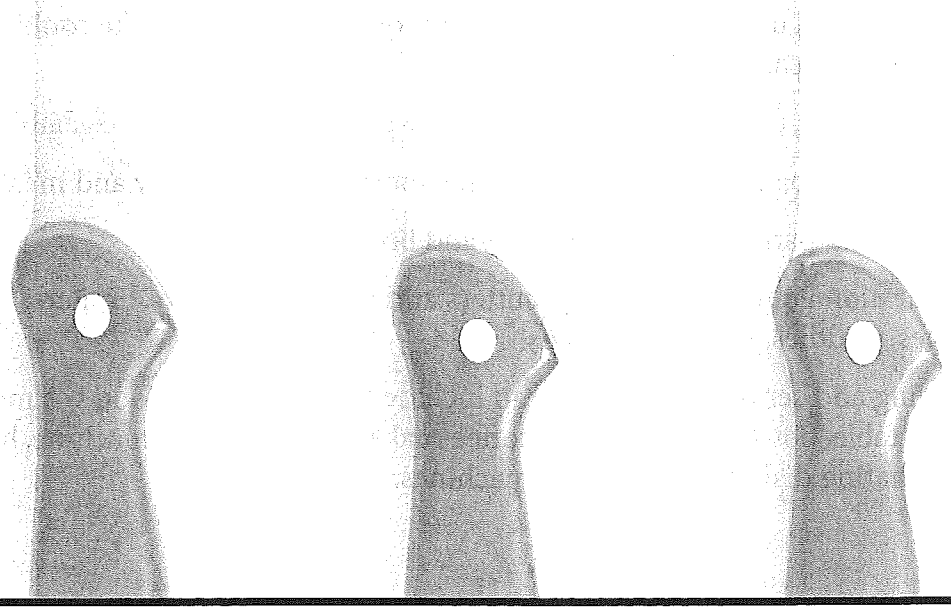
Summary

In this section, you learned the following:

- Receiving equipment includes receiving tables/area, scales, and utility carts. After food is received, it is stored on shelving or in refrigerators and freezers (walk-in or reach-in).
- Pre-preparation equipment includes knives, measuring utensils, hand tools and small equipment, and pots and pans.
- Pots come in many shapes and sizes and are made of copper, cast iron, stainless steel, and aluminum, with or without nonstick coating. The most common pots include the following:
  - Stock pot, used for preparing stock
  - Sauce pot, used to prepare sauces, soups, and other liquids
  - Double broiler, used to gently cook the food in an upper pot, over a lower pot that holds boiling or simmering water
  - Brazier, used to braise meat and vegetables
- Pans come in many shapes and sizes:
  - Saucepan, used for general cooking, particularly liquid or liquid-based mixtures
  - Sauté pan, used to sauté items
  - Cast-iron skillet, used for pan grilling, pan-frying, and braising foods such as meat and vegetables
  - Sheet pan, used for many things, but most commonly to bake cookies, rolls, and cakes
  - Hotel pan, used for baking, roasting, or poaching meat and vegetables
  - Roasting pan, used to roast and bake foods such as poultry and meat
  - Braising pan, used to braise, stew, and brown meat
- Preparation equipment includes cutters and mixers, steamers, broilers, ranges, griddles, fryers, and ovens.
- Holding and serving equipment can include the bain-marie, food warmer/steam table, hot-holding cabinet, coffee maker, tea maker, ice machine, hot box, chafing dishes, and espresso machines.

Section 5.1 Review Questions

1. Identify the use(s) for the following knives:
   a. Boning
   b. Cleaver
   c. Paring
   d. Serrated slicer
   e. Utility
2. List and describe five common measuring tools.
3. List the safety guidelines for using large preparation equipment.
4. Compare the different types of ovens used in the restaurant or foodservice kitchen.
5. Why would Benny Gordon state that knife skills are the foundation of cooking?
6. What knives and hand tools should Alex carry with him as an entry-level cook?
7. What is the difference between a pressure steamer and a convection steamer? When would you use each one?
8. Why might a restaurant or foodservice operation want to use specialized equipment? What equipment would you expect to find at a casual-dining restaurant?



Section 5.1 Activities

1. Study Skills/Group Activity: Knife Safety Poster

Work with two other students to develop a poster about knife safety, including how to pass and transport knives. Use graphics to depict proper handling.

2. Activity: Preparation Tools

What preparation tools would you need to prepare and serve a pizza? Mashed potatoes? A beef stew?

3. Critical Thinking: It Can Only Be One

If you could have only one piece of major cooking equipment (for instance, a range or a steamer) in your professional kitchen, what would it be? Write two paragraphs defending your selection.