

Food Service Equipment

YOU CAN MAKE a great dinner for your family in your home kitchen. But if you are trying to feed dozens or perhaps hundreds of people in an evening, you will need specialized equipment in a commercial kitchen. Workstations make the kitchen more functional and efficient. This is especially important when several people are working together. In this unit, you will learn about the workstations and equipment that are necessary in a food service establishment.



Objective:



Identify the major food service work areas and equipment.

Key Terms:



cold storage
dollies
dry storage
FIFO
garde-manger
hot storage
labeling equipment

measurement
equipment
National Sanitation
Foundation (NSF)
nonporous
nontoxic
preparation area

receiving area
sanitation
storage area
temperature danger
zone
thermometers
workstations

Food Service Work Areas and Equipment

A well-designed food service kitchen is efficient, allowing for appropriate work flow, and is easy to clean, using surfaces such as stainless steel and tile. There are several work areas that are essential for any institution serving food to the public.

RECEIVING AREA

The **receiving area** is the location where all goods enter the food service facility. In the receiving area, food products ordered by the controller are monitored and inspected by the receiver and either accepted or rejected. Food items are checked against the invoice for quantity, weight, item type and style, freshness and quality, temperature, and damage.

Equipment used in the receiving area includes thermometers and measurement equipment.

Thermometers

Thermometers are devices that measure surface and internal food temperatures. Infrared types measure the surface temperature of food items. Probe types measure the internal temperature of food items and may have digital, gauge, or mechanical readouts.

Temperature checks ensure that foods are safe to serve to customers. Perishable foods must be kept out of the temperature danger zone. The **temperature danger zone** is the range between 41° and 140°F. Frozen foods should be at 0°F or below, and fresh refrigerator foods should be at 41°F or a little below. When food items do not meet these temperature specifications, they should be rejected and sent back to the distributor.



FIGURE 1. Thermometers are used to ensure that certain foods are cooked to or stored at appropriate temperatures.

Measurement Equipment

Measurement equipment is equipment used to check the temperature and weight of food items and to ensure that each item meets the facility's specifications. Scales are used to measure the weight of foods, but different types of scales are used for different purposes. Platform scales are used to check the weight of heavy items. Portion, digital, and baker's scales are used for smaller items throughout the food service establishment. If a food item does not meet the weight specified on the order, it should be rejected.

Other Specialized Equipment

Other specialized equipment is also used in the receiving area. **Labeling equipment** is equipment such as pre-printed labels and markers used to identify food items, especially when the items will not remain in their original containers, and to record the date received. Arrange older foods on the shelf to be used first, in accordance with **FIFO** (first in, first out). Box cutters are tools used to open the cases of food to check for order accuracy and damage. **Dollies**

are hand trucks, platform carts, or utility carts used to transport heavy boxes and bags to their proper storage area or from one area to another.

STORAGE AREA

The **storage area** is the designated location where foodstuffs are kept until they are needed. The food items must be kept in a safe and monitored environment. Not all food items can be stored in the same way. The three basic types of storage are dry, cold, and hot storage.

Dry Storage

Dry storage is the designated location for nonperishable foods. Nonperishable food items do not require refrigeration and have a long shelf life. They include canned goods, dry beans, pasta, flour, and sugar. In some larger establishments, even dry storage is kept slightly refrigerated at 65°F. Dry storage is often a small room with equipment that promotes orderly storage. For example, there may be shelving units that allow all the tomato products to be grouped in a common area. Dry storage areas also often include rolling and stationary storage containers and bins for dry items such as flour or sugar, as well as slatted storage racks.

Cold Storage

Cold storage is a containment area that keeps perishable foods fresh and safe; it is crucial for keeping potentially hazardous foods safe. Cold storage locations are equipped with slatted shelving for continuous air circulation as well as temperature and humidity controls. Refrigerators and coolers must be 41°F or lower. Freezer storage temperature is required to be 0°F or below. Cold storage equipment comes in different styles, and although the purpose is the same, the equipment is chosen to suit the needs of the establishment and of the workstation. Reach-in refrigerators or freezers are designed to keep perishable foods safe and are often located in each cold food workstation. Commercial refrigeration units operate like household types and keep food items at or below 41°F. Workers open the doors and place food items on the shelves. Under-counter refrigerators or freezers are made for easy access to cold storage. The units are placed in specific work areas to hold small amounts of food.

Hot Storage

Hot storage is equipment used to maintain food temperatures at 140°F or above, as recommended. Food must be held at a minimum of 140°F to ensure it is safe for customers. Restaurants use several styles of hot storage equipment. Bain-maries are deep pots filled with hot water into which other pots holding food items are placed. Steam tables are often used for cafeterias and buffet lines. Hotel pans are placed in steam table compartments over the hot water to hold food at or above 140°F. Hotel pans come in a variety of sizes to suit the needs of the restaurant and often have high domed lids to keep in the heat.

Heated carts transport heated food to the place of service. They are used to ensure plated foods and pans of food remain hot while waiting to be served. Hospitals, airlines, and banquet

rooms use heated carts extensively. Proof cabinets are similar-type heated cabinets with water cavities, which create steam, for the final out-of-oven rising of breads and pastries. Overhead warmers ensure plated and prepared food items remain hot while waiting to be served. Electric elements in the lamp fixtures emit dry heat and may be adjusted to ensure that no additional cooking takes place. Chafing dishes allow hot foods to be stored above hot water or directly on a heat source for service. They are used for catered events and in restaurants to keep cooked foods hot. Most use a portable canned fuel heat source.

Catering establishments use temperature-controlled equipment to ensure food stays at safe temperatures during transport to catered events. Caterers use utility carts and dollies to move the large carriers from place to place when delivering food.

PREPARATION AREA

The **preparation area** is any location where food is processed or any location where food is cooked. The equipment used in the preparation area is varied and is located according to task. A preparation area is further broken down into workstations.

Workstations are the places where employees perform specific food processing and production tasks, such as preparing sauces or broiling meat.

Workers are trained to do the specific tasks and to safely operate the equipment used in a station. Training ensures that standards of quality and efficiency are met. Having a water supply in each major workstation saves time and energy. In some cases, workstations are used to prepare food for use at other workstations. For example, an employee may chop vegetables at one workstation and then give them to an employee at another workstation to use in the preparation of an omelette.



FIGURE 2. This workstation includes all the tools necessary for chopping vegetables, as well as a sink.

Sanitation Equipment

Maintaining sanitation equipment in a food service establishment is essential. If the sanitation practices of a restaurant fail, the establishment inevitably fails. State codes and local health departments force food services to comply with safety and sanitation guidelines.

The **National Sanitation Foundation (NSF)** sets standards of fabrication and inspection of restaurant equipment. The equipment must be able to withstand heavy use in commercial kitchens. Examples are worktables, cutting boards, knives, pots, and pans. All equipment

used in a restaurant must be NSF approved and must carry a blue NSF seal. To earn the seal, equipment must be easily cleanable. It must have a smooth surface, with smooth and rounded internal and external corners. Surfaces must be **nonporous** (meaning they do not hold or absorb debris), **nontoxic** (meaning they do not chemically react to foods), and corrosion resistant. Units must also be easily dismantled.

Commercial sinks come in many sizes and styles, depending on the intended use. Commercial sinks assist employees in proper sanitation. **Sanitation** is the process of reducing bacteria to safe levels on all surfaces, including those in processing areas and production areas. Clean and sanitize all sinks before use.

There are different types of sinks for different uses in the kitchen. Two-compartment sinks are used in preparation areas. Three-compartment sinks are used to wash and sanitize wares. In a three-compartment sink, the first compartment is for washing, the second is for rinsing, and the third is for sanitizing. A four-compartment sink has a compartment for spraying and removing debris before washing. Hand sinks are for hand washing only. Kitchen areas should have hand sinks located throughout the workstations.

Commercial dishwashers are used to make washing wares quick, efficient, and safe. Dishes are loaded onto racks that go through a dishwasher. Commercial dishwashers perform the duties of prewash, wash, rinse, sanitize, and dry. This makes the labor-intensive job of ware washing less time consuming.

Garbage disposals are used to eliminate food waste rinsed from wares. A garbage disposal grinds food items and washes the waste into the sewage system. Most of the food waste should be placed in garbage cans, but the amount left on the wares can be sprayed off and run through the disposal. A disposal must be clear of items that may have accidentally been dropped or been flushed there, such as utensils, because foreign items may damage the disposal and may be dangerous for the disposal operator.

Fire Safety Equipment

Fire suppression systems and fire extinguishers are mandatory in food service establishments. A fire suppression system is a sprinkler system installed in the cooking area of a kitchen. This system will activate when there is extreme heat and smoke. The system will spray an extinguishing chemical to smother the fire. A fire suppression system is usually located in the ventilation hood of the hot food cooking area.

Hand-held fire extinguishers are also placed in several posts throughout the kitchen. Different classes of extinguishers are suited to different types of fires. Use of the wrong extinguisher on a fire can be hazardous and even fatal.

Class A extinguishers are used to suppress common combustible items, such as wood, paper, trash, and cloth. These are often dry chemical systems that use sodium bicarbonate, or baking soda, as the extinguishing agent. Class B extinguishers are used on flammable liquids, and a dry chemical, sodium bicarbonate, is the extinguishing agent. Class C extinguishers are used on electrical fires, and a dry chemical, sodium bicarbonate, is the extinguishing agent. Multipurpose extinguishers are ABC rated, and a salt, ammonium phosphate, is the extinguishing agent.

Class K extinguishers are a recent addition to the arsenal of hand-held extinguishers and were developed specifically for fires involving deep fat fryers. Many are of a wet chemical variety and contain a potassium-acetate-based, low-PH agent originally developed for use in pre-engineered fire extinguishing systems for cooking equipment. Class K extinguishers are rated for use with commercial “combustible cooking media” (grease and oil) fire hazards in the kitchen. They are also available in a dry chemical version that uses potassium bicarbonate as the extinguishing agent.

For a small grease fire in a saucepan or pot, apply the pan or pot cover to extinguish small flames.

Beverage Workstation Equipment

Beverage workstations include equipment used to prepare drinks, keep them hot or cold, and serve them. Examples are a coffee brewing system, a carbonated beverage system, a thermal serving system, and an alcohol beverage station for a restaurant with a bar area.

Cold Food Workstation Equipment

In the cold food workstations are various types of equipment based on the menu, style, and size of the restaurant and on the skills of the employees. **Garde-manger** is a French term for a storage or preparation place that is cool and well aired, as well as the name for the chef who supervises the cold food workstations. Equipment in the garde-manger stations is used to prepare quantities of cold food quickly and efficiently. All cold buffet foods are prepared in these stations. In addition, raw food preparation, such as boning and trimming meat or trussing poultry, is done here. Workers in these stations also prepare garnishes, salads, salad dressings, mayonnaise, and cold meat and cheese trays. Refrigerated air is drying, so food items that will not be used within a few hours should be wrapped tightly.

Equipment in the cold food workstations includes refrigerated storage, food slicers, mixers, food processors, and mandolins. Blenders, juicers, worktables, cutting boards, knives, and scales are used, as well.

Hot Food Workstation Equipment

The equipment in hot food workstations varies, based on the restaurant’s menu, style, and size. An extensive French menu would require numerous hot food workstations, whereas a coffee shop menu would require only a few. Equipment in hot food workstations is used to cook a quantity of food quickly and efficiently. Food service employees must be trained in, and tested on, the safe operation of all hot food equipment. It is also imperative that employees



FIGURE 3. Blenders are generally found in cold food workstations.

read the user’s manual for the equipment prior to operation. Equipment includes ranges, ovens, broilers, fryers, grills, kettles, and steamers. Additional examples are griddles, mixers, worktables, cutting boards, knives, scales, pots, pans, and overhead storage racks.

Food is cooked to make it more palatable and attractive. The cooking process changes the taste, color, and texture of food. Heat sources used in cooking include electricity, gas, and wood. There are many different types of ovens and cooking equipment, and each type has a specific purpose. The menu dictates the cooking equipment necessary for each food service establishment.

A convection oven has a fan inside the cabinet to circulate the heat around the food. Most food cooks about 30 percent faster than in a conventional oven. Convection ovens preheat in about 5 minutes, whereas conventional ovens may take about 20 minutes. Food trays in convection ovens can be closer together than in conventional ovens. A convection oven may have a “cook and hold” option, in which you can insert a thermometer probe into a roast or ham. When the meat reaches the proper internal temperature, the oven keeps the food warm without continuing to cook it. This means you could set a “cook and hold” oven before leaving in the evening, and a prime rib would be ready to serve for lunch the next day.

Deck and stack ovens have multiple ovens or baking shelves stacked on top of one another. Each oven has its own door and individual temperature controls.

Microwave ovens cause water, fat, and sugar molecules in foods to vibrate, cooking foods faster. A microwave oven creates a type of chain reaction of heating food without heating the air around it. The vibrations continue for a short time after the food is removed from the oven, so total cooking time usually includes a few minutes of “stand time.” Place food in the center



UNDER INVESTIGATION...

LAB CONNECTION: Comparing Cooking Times

A convection oven circulates the heat around food to cook it about 30 percent faster than a conventional oven. Even the preheat time is much shorter. Conduct a simple experiment to compare the cooking times in the two ovens. You’ll need:

- Access to both a convection oven and a conventional oven
- Ingredients and tools to prepare the recipe of your choice for each oven
- A timer or clock
- Paper and a writing utensil to record your results

Preheat the ovens while you prepare the ingredients. Time how long each oven takes to reach the proper temperature. Write down the time for each. Then, bake your prepared recipe. Compare the baking times in the two ovens. Add the preheat time to the baking time for the convection oven, and then repeat the process with the times for the conventional oven. How much time did you save using the convection oven? Write down any additional observations about the food, such as whether it was evenly browned.

of a microwave for best results. The original purpose of microwave ovens was to defrost and reheat food items, and these still are the tasks they perform best.

Flash bake ovens use infrared light waves to cook foods quickly. These ovens do an exceptional job of retaining the moisture in foods.

Wood-burning ovens are made of masonry or brick on the inside to hold the heat of the wood. These ovens give foods a smoky flavor. Insert and remove foods with a peel, which is a tapered paddle with a long handle. There are several types of peels, including wooden styles and banjo metal styles, used for turning and retrieving foods.

A conventional oven is usually located under the range top and is typically a standard two-shelf model. One shelf is often removed when roasting a turkey or a large cut of beef.



FIGURE 4. A pizza is removed from a wood-burning oven with a peel.

Deep fryers fry foods in hot, deep fat. Some models are floor mounted, while others are smaller, portable models that sit on the counter. To use a deep fryer, place food in a wire mesh basket, lower it into the hot fat, and remove the basket to drain the food when cooking is complete. Most fryers have thermostats and timers.

Ranges have ovens underneath burners or flat grill surfaces. Ranges cook food items on open burners, which may be gas or electric. Ranges usually have four to eight burners with individual controls.

Grills and griddles are terms often used interchangeably. However, grills are usually associated with cooking meats outside, and griddles are usually associated with cooking pancakes. A grill or griddle is a flat or grooved/grated stainless steel surface with a burner underneath used to cook food by placing it on a grate over an open heat source. Usually a grill or griddle is not washed because this would cause foods to stick to the surface. Instead, the grill or griddle is wiped, and any caked-on food is removed with a pumice stone (a soft volcanic rock that cleans without scratching). Most grills and griddles have troughs to collect the grease and back-splashes to prevent splatters.

A kettle is used to cook a large quantity of food using steam that runs inside the walls of the kettle. A steam-jacket kettle sits on the floor, while a trunnion kettle is mounted on a table top between two pivots. Both models have gear-driven mechanisms that allow the kettles to tilt and pour the food into serving containers.

A broiler applies direct heat to food from above, from below, or from the sides. The heat source is electricity, gas, charcoal, or heated rock. Specialty establishments use charcoal or wood fire ovens to broil meats and vegetables. An oven may use a broiler pan (a perforated pan

set inside another sided pan) to hold the meat away from drippings. Broiling also can be done with infrared lamps—a very fast cooking source.

Tilt brazier pans can be used as steamers, griddles, frying pans, and ovens. They cook with oil or water that can be poured off when cooking is complete. A brazier's special features are a pouring lip and a cover that swings up to allow the pan to be tilted by turning a wheel. Braziers are common in large kitchens and are used to produce large quantities of pot roast or braised chicken dishes.

Steamers use live steam to cook food. Steam can be free steam or under pressure. Free steam is about the same temperature as boiling water. In contrast, steam under pressure is able to produce temperatures above boiling. Steam is a good choice among food service professionals because it cooks foods quickly and without fat or oil. Steamers reduce the loss of vitamins and minerals from produce as it cooks, and foods do not stick to the pan as when cooked over direct heat surfaces.

Other Equipment

Cutting boards come in many types. Wood is common for household use, but food service establishments typically use cutting boards made of polyethylene plastic. Cutting boards protect table surfaces and knife blades when cutting, slicing, and chopping food items. Commercial kitchens may use color-coded boards to prevent cross contamination. For example, beige may be used for raw fish and shellfish, red for raw meats, blue for cooked foods, white for dairy products, green for fruits and vegetables, and yellow for raw poultry.

Bench mixers range in size from 5 to 20 quarts. Mixers also come in handheld and floor models. Most have three or four mixing speeds and utilize three basic attachments or agitators. The paddle is a flat blade for general mixing tasks. The wire whip is evenly spaced wires in a conical shape for whipping eggs, egg whites, or heavy cream. The dough hook is an arm-shaped attachment used for mixing and kneading yeast dough. Mixers save employee time and labor by making the mixing process more efficient.

Food processors chop, slice, dice, shred, and puree raw and cooked food items. They save much employee time and labor.

Slicers are also time- and labor-saving devices. A slicer has a circular spinning blade that is adjustable for thickness. A carriage with an arm is used to move and push the food, such as meat or cheese, against the blade to ensure uniform slices, especially for portion control. Slicers require upper and lower blade guards and are still dangerous to operate and to clean. Employees must be trained in, and tested on, the operation of the equipment.

Worktables are essential equipment in all the kitchen's workstations. They come in an assortment of sizes, heights, and styles and are usually made of high-quality stainless steel. Workers set up a table to perform a task, such as making sandwiches, more efficiently. For example, food generally enters the table from the left, and the finished product is removed from the right.

Summary:



A well-designed food service kitchen is efficient, with workstations designed to accommodate different jobs, such as receiving and storing supplies, preparing ingredients, and cooking food. All equipment used in commercial kitchens should meet standards set by the National Sanitation Foundation. While some types of equipment serve to make work more efficient, others are designed for safety purposes. Fire extinguishers, for example, are essential for safety, and multi-compartment sinks are used to sanitize items. A variety of refrigeration units, ovens, and ranges are available to meet the needs of food service kitchens.

Checking Your Knowledge:



1. What are workstations?
2. What standards are set by the NSF for kitchen equipment?
3. What are the differences between categories of fire extinguishers?
4. How are color-coded cutting boards used?
5. What are the different types of ovens found in commercial kitchens?

Expanding Your Knowledge:



Visit a commercial kitchen in a food service establishment. Ask an employee to give you a tour and identify the equipment. Compare the food service equipment to items you would find in a home kitchen. Ask about the various workstations and what work is done at each location. Is there a water supply at each station? Locate all the tools, such as knives, cutting boards, and peelers, that would be needed at a particular station.

Web Links:



Convection Ovens

<http://www.wisegeek.com/what-is-a-convection-oven.htm>

Designing an Efficient Kitchen

<http://e-ditionsbyfry.com/Olive/ODE/FoS/default.aspx?href=FoS%2F2010%2F04%2F01&pageno=22&entity=Ar02200&view=entity>

National Sanitation Foundation

<http://www.nsf.org/>