

CLEAN, SANITIZED AND STERILIZED

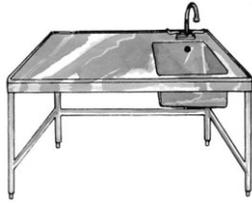
CLEAN: Surface has been scrubbed and washed with water (>110°F) and detergent to loosen biofilm (grease and dirt) and rinsed with clean water (>110°F).

SANITIZED: Sanitizing agent or solution has reduced pathogens to safe level.

A safe standard is 100 or less non-specific aerobic organisms per 8 sq. in. (50 sq. cm.).

STERILIZED: The chance of pathogenic organism is < 1 in 1,000,000,000 (trillion) grams of food. (Commercially canned foods are processed to this standard.)

Visual cleanliness is not a reliable indicator of surface sanitization.
Clean-looking surfaces can have millions of microorganisms stuck in the surface



965
10/27/2005

1908

46

965

Cleaning and Sanitizing

Clean means free of dirt, soil, and grease. Warm to hot water (110 to 120°F) and detergents and/or acid cleaners are essential in dissolving grease and removing dirt from surfaces. Cleaning is critical to sanitizing because a greasy surface protects pathogens, and dirt will neutralize the sanitizing agent, making it ineffective. Proper cleaning removes microorganisms to less than 100 per 8 square inches.

Sanitizing

Sanitizing agents and solutions should be used after washing as a safety factor to reduce the number of microorganisms on surfaces as much as possible. **Sanitize means to reduce the general population of microorganisms to a safe level.** While this has not been specified, it is generally considered to be less than 100 organisms per 8 square inches. This is a safe level compared to the number of organisms already present in food, which are the real problem.

Sterilized

Practically speaking, **sterilized means no pathogenic microorganisms.** Sterilized surfaces and utensils are found in medical facilities such as hospitals. There are no sterile surfaces in foodservice, only sanitized surfaces.

Detergents

Proper detergents are used in specified proportions according to the cleaning and sanitizing schedule for each cleaning task. Aluminum articles should never be washed with a highly alkaline or acidic solution because these solutions will corrode the surface. Adequate supplies of detergents and other cleaning compounds must always be available. Supplies should be checked regularly and reordered when necessary.

Employees must be very careful when they use foodservice cleaning compounds. Many are toxic if swallowed. Eyes and skin can be burned if the chemicals get on them. Cleaning agents and sanitizers should never be mixed together because toxic gas is released and the sanitizer is neutralized.

Cleaning Cloths

While regulations currently state that wiping cloths should be stored in an approved sanitizing solution, this is truly ineffective. The dirt from the wiping cloth neutralizes the sanitizer and

decreases its effectiveness. When wiping clothes are kept in sanitizing solutions, the solutions become contaminated with microorganisms. Wiping cloths should be stored in detergent and water. The sanitizing solution should be kept clean by placing it in a squirt bottle and applying it to surfaces after they have been cleaned and rinsed.

Visual Cleanliness

Visual cleanliness has been shown in studies to be of no value as an indicator of microbiological contamination of the surface. Microorganisms cannot be seen with the eye. If raw food is placed on a surface, removed from the surface, and the surface is wiped with a dry or moist rag, the surface will look clean but it will have thousands of microorganisms per square inch. The four-step **wash, rinse, sanitize, air dry** procedure must be used.



1291

Wash, Rinse, Sanitize, Air Dry

Effective cleaning and sanitizing of surfaces involves four steps. (A preliminary step is to pre-rinse / remove loose debris. This will reduce pathogens about 1,000 to 1.) The steps are washing, rinsing, sanitizing, and air drying. These four steps should be used to clean and sanitize work stations and food preparation areas every 4 hours or more often, if necessary.

- **Wash.** Clean as you go. Rinse as much soil from the surface as possible. Use a paper towel to wipe large pieces of soil from the surface. Next, use a warm detergent solution (90 to 110°F) and cleaning cloth and/or scrub brush to loosen the soil and surface film and deposit the scraps into a disposal or waste can. Wash water should be discarded as soon as it becomes dirty and/or becomes too cool.

It is important to remember that sanitizers cannot penetrate food-soiled surfaces. Cleaning and sanitizing solutions must be applied separately to food contact surfaces and equipment. Surfaces must be washed and rinsed before sanitizer is applied.

- **Rinse.** Use clean warm water (90 to 120°F) and another cloth with the rinse water to remove the detergent solution and soil. If possible, flush the counter or equipment with hot water. This is a critical step. The microorganisms and surface contaminants must be washed off; otherwise, they will reduce the effectiveness of the sanitizer. Rinse water should be changed as it becomes dirty or when it becomes cool (less than 75°F).
- **Surface Sanitize.** Use a pre-mixed sanitizing solution, in a plastic squirt bottle. Sanitizing solutions (e.g., a 50 ppm chlorine solution, approximately 1 teaspoon bleach per gallon of water) should be mixed daily, or more often if necessary. The sanitizing solution can be dispensed easily from the squirt bottle. A clean paper towel should be used to spread the solution. Tables and counter surfaces should be cleaned and sanitized every 4 hours or at the end of the meal to keep microbial counts on food contact surfaces low.

Separate, freshly cleaned and sanitized cutting boards and knives should be used for raw and cooked foods. Equipment used for raw food preparation should always be cleaned and sanitized before it is used to prepare cooked food.

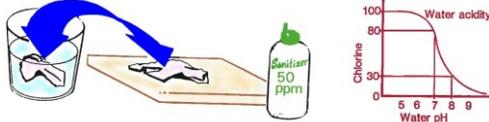
- **Air Dry.** Allow surfaces to air dry thoroughly. Microorganisms multiply on wet surfaces because low levels of organic material still remain on the surface. Air drying prevents the multiplication of the few microorganisms left on the surface.

USING A SANITIZING SOLUTION

- Measure chemicals carefully.
- Never mix detergent and chemical sanitizer
- Water must be $\geq 75^{\circ}\text{F}$.
- Use a clean towel to spread the sanitizer.
- Keep towels in sanitizer solution.



Surface Sanitizing: 50 ppm hypochlorite =
Approx. 1 teaspoon bleach per gallon of water



1295
10/27/2005

1908

48

1295

Sanitizing Solution

Sanitizing chemicals normally require dilution with water, according to label instructions, before use. Too much sanitizing chemical can be a toxic hazard. Measure chemicals carefully.

Sanitizing Chemicals

Three primary sanitizing chemicals are used in food service facilities: **chlorine**, **iodine**, and **quaternary ammonium compounds**. The permitted concentrations are as follows.

Chemical	Immersion (1 min., 75°F)	Surface	Maximum
Chlorine	50	50	200
Iodine	12.5	12.5	25
Quaternary Ammonium Compound	150 to 400	150 to 400	400

Chlorine

Chlorine is the best broad-spectrum microbiological agent. It is also inexpensive because household bleach can be used. A guide to mixing various concentrations of chlorine sanitizing solutions is as follows.

- 200 ppm = 1 tablespoon 5.25% bleach/gallon of water
- 100 ppm = $\frac{1}{2}$ tablespoon bleach/gallon of water
- >50 ppm = $\frac{1}{4}$ tablespoon bleach/gallon of water (approx. 1 teaspoon/gallon of water)

Use newly manufactured chlorine bleach that is less than 6 months old, because it loses strength in storage. Do not use too much or increase the amount of bleach in the sanitizing solutions, because chlorine can corrode metal and cause skin irritation. Change sanitizing solution often.

Do not mix a chlorine sanitizer with any other cleaning compound. Deadly chlorine gas will be given off.

Iodine

Iodine is not quite as effective a sanitizer as chlorine and it is more expensive. However, it is less irritating to skin and hands. Sometimes it is used in bars to sanitize glasses because it leaves less flavor on glasses. Iodine sanitizers tend to leave

objectionable stains on porous equipment such as cutting boards and plastic.

Quats

Quaternary ammonium compound sanitizer solutions do not inactivate pathogens as well as chlorine or iodine sanitizing solutions and may leave an oily film on surfaces. They are ineffective against viruses. They are quite useful for sanitizing floors, walls, and non-food contact surfaces. They are less corrosive than iodine and chlorine sanitizers. Quaternary ammonium compound sanitizer solutions are often used for sanitizing the inside surfaces of refrigerators and walk-in coolers to control spoilage microorganisms.

171°F Water

Another method of sanitizing surfaces is simply using hot water or steam at hotter than 171°F for a 30-second contact with the surface to be sanitized. This is the simplest and most effective of all methods. It is useless to put sanitizer chemicals in 171°F water. The temperature of the hot water makes it sufficient for use as a sanitizer alone, and the chemicals evaporate rapidly from hot water.

Sanitizer Temperature

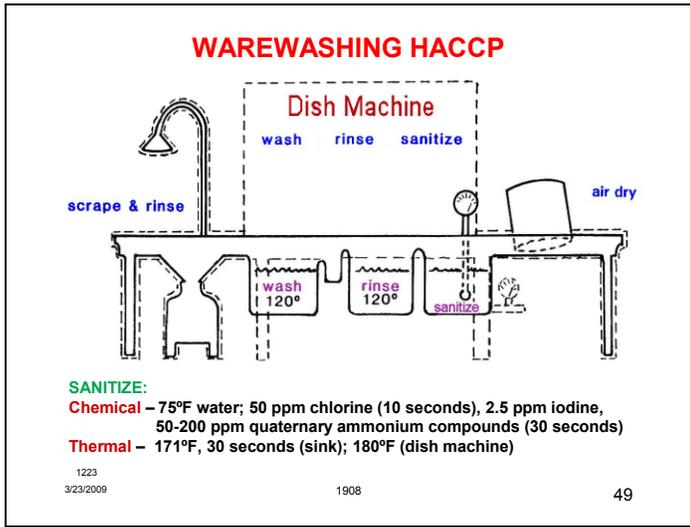
The contact time of 1 minute for immersion sanitizing is based on 75°F water. If the water is cooler, contact time must be extended. Also, the hotter the water up to 120°F (at which point the chemicals are less stable), the faster the chemicals inactivate microorganisms.

Surface Sanitizing

FDA regulations currently state to keep the sanitizer wiping clothes in sanitizer solution. However, it was not the intention of the regulation that the sanitizing solution used for storing with wiping clothes be used to sanitize surfaces. Keeping wiping clothes in solution that is used to sanitize surfaces is a poor procedure because wiping clothes pick up dirt and food soil that neutralize all sanitizers. Wiping clothes should be stored in a warm detergent solution so that surfaces can be cleaned to remove soil before sanitizing. The detergent solution must be changed when it becomes even slightly dirty, about every hour.

The squirt bottle and clean paper towel method is the best way to apply a sanitizing solution. Fresh sanitizing solutions should be prepared by the manager each day (because they deteriorate with time) and put into squirt bottles. Squirt bottles are better than spray bottles because the surface must be flooded with sanitizer.

Sponges should not be used for cleaning and sanitizing purposes because they are essentially impossible to clean and sanitize and hence, spread microorganisms.



1223

Warewashing HACCP

Whether done by hand or by machine, dish washing and pot and pan washing procedures should follow the same steps:

- **Scrape and rinse.** Without this step, food contaminates the washing water at a high rate and decreases the detergent effectiveness. Plastic scrub brushes and pads should be used. Metal scrubbers tend to break apart. The metal fragments remain on equipment surfaces and get into food.
- **Wash.** An accurately measured detergent solution in the first compartment of the 3-compartment sink must be kept clean and at 110 to 120°F to dissolve and suspend greasy soil.
- **Rinse.** Rinse equipment, cutting boards, utensils, etc., by immersion in the second compartment of the sink using clean water at a temperature of 120°F. Change the rinse water as it cools or shows the presence of detergent suds. If the detergent and dirty water from the first sink are not washed off thoroughly in the second sink, the sanitizer will be neutralized by the soap and dirt.
- **Sanitize.** Surfaces can be chemically sanitized in the third sink by placing them in a sanitizing solution such as 50-ppm chlorine for 10 seconds, or 12.5 ppm iodine or 150 to 200 ppm quaternary ammonium compounds for 30 seconds. The solution should be between 75 and 120°F, and the proper proportion of chemical to water must be maintained.
 As an alternative to using chemical sanitizers, items can also be sanitized in the third sink by immersion in very hot (171°F) water for 30 seconds in order to get the surface of utensils up to 165°F.
- **Air dry.** Allow surfaces to air dry thoroughly. Microorganisms do not multiply on dry surfaces. Towels should never be used to dry utensils and pots and pans because of possible recontamination of surfaces. If it is necessary to remove excess water from surfaces to promote rapid air drying, use a clean towel dipped and wrung out in 50-ppm chlorine sanitizer solution.

Dishes, tableware, and pots and pans should be stored according to food safety principles. Cups, glasses, pots, and pans should be stored upside down on a sanitized surface to prevent insects and objects from falling into them. Tableware and utensils

should be stored so that food contact surfaces are not touched when someone reaches for them.

Washing Equipment Cleaning and Maintenance

Washing machinery, sinks, and storage equipment must be kept clean to avoid contaminating sanitized dishes, utensils, pots, and pans. Machine strainers and wash nozzles should be cleaned every shift. Rinse nozzles should be cleaned every day or as prescribed by the manufacturer. Soap and sanitizer supply systems must be filled, and the audible or visual warning device for replenishing the supply should be in working order. Machine strainers and nozzles should be delimed according to the cleaning schedule.

Tableware should soak in a detergent solution prior to washing and must be racked flat to run through the dishwasher.

Water should be at the machine-specified temperature and at 15 to 25 pounds pressure for adequate sanitizing. A chemical test kit should be used to check chemical levels. An accurate thermometer must be used in the dish machine to indicate all wash and final rinse temperatures. The pressure gauge and valve for checking pressure on the final rinse line must be maintained. Washed dishes should be inspected to make sure they have been cleaned before they are put away or used for service.