

CHAPTER 12 | STUDY GUIDE

1 | Decide What the Surface Needs

Cleaning removes soil. Sanitizing treats a cleaned food-contact surface using a suitable heat or chemical process. Disinfection addresses pathogens not controlled by the available sanitizer. These are related jobs, not interchangeable words. This chapter uses the FDA Food Code 2026 as its model; actual operations must check locally adopted requirements, product labels, and equipment instructions.

Recognize	Understand and apply
Clean to sight and touch	Remove food, grease, and deposits, including material hidden beneath guards or inside seams. A clean appearance is necessary but does not prove the sanitizing step occurred. Sanitizer cannot replace soil removal.
Sanitize after cleaning	Treat food-contact surfaces before use after cleaning. The selected process needs all required conditions, not just a chemical smell or a hot-water supply. Sanitizing is not sterilizing and should not be relied on to remove allergen residue.
Use distinct disinfection	The Code requires disinfection when available sanitizers do not control the pathogen in the specified bodily-fluid, outbreak, or imminent-hazard situations. The product must be appropriate for the intended surface and use.
Recognize immediate triggers	Clean when moving from raw food to ready-to-eat food, between raw produce and TCS-food uses, before using or storing food thermometers, and whenever contamination may have occurred. Different raw animal foods also trigger cleaning, subject to the narrow raw meat-and-poultry sequence exception.

Worked decision: the ten-minute board

A board used for raw chicken is needed for cooked sandwich meat after only ten minutes. Clean and sanitize it before the new task. Four hours is an interval for ordinary TCS-food use, not a waiting period after a task change. A dropped probe also needs action immediately, even if it was cleaned a moment ago.

Remember: Ask first what touched the surface and what will touch it next. Then choose the process and timing; appearance alone cannot answer those questions.

Memory cues and recall practice: pages 10-11.

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2 | Use Cleaning Intervals Without Losing the Exceptions

Equipment and utensils contacting time/temperature control for safety (TCS) food normally need cleaning at least every four hours during use. A task change or possible contamination can require earlier action. Sanitize before reuse after cleaning. The exceptions below change the interval only when their conditions actually exist; they do not excuse dirty equipment.

Recognize	Understand and apply
Refrigerated prep area	Document the cleaning frequency based on maintained room or area temperature: 41 F or below, every 24 h; above 41 through 45 F, every 20 h; above 45 through 50 F, every 16 h; above 50 through 55 F, every 10 h. Cold food on an ordinary counter does not qualify. These are not food-holding limits.
Storage and probes	Stored TCS-food containers kept with their contents at required temperatures are cleaned when empty. A probe may remain in food held at required temperatures. Storage equipment such as reach-ins is cleaned often enough to prevent soil buildup.
Service and hot utensil water	Ready-to-eat TCS-food service containers can be intermittently replenished with the same properly held food when the existing food also stays properly held; clean at least every 24 h. For utensils intermittently held in water at least 135 F, clean utensils and container at least every 24 h and sooner to prevent soil buildup.
Approved schedules	Other extended schedules require regulatory approval based on equipment use, food, residue accumulation, and temperature. A manager cannot approve an exception merely by writing a longer interval on the wall.
Raw-product sequence	The narrow transition exception covers successive raw meat and poultry types each requiring a higher cooking temperature. Fish, equal/lower temperature sequences, and raw-to-ready-to-eat changes do not qualify.

Worked decision: a colder ingredient is not a colder room

A slicer in a normal prep room handles cooked TCS meat arriving at 38 F. Use the ordinary four-hour interval, not the refrigerated-room exception. A maintained 44 F prep room with a documented schedule can use the twenty-hour band, but contamination still requires earlier cleaning.

Remember: Identify the equipment use, temperature condition, and documentation or approval before extending an interval.

3 | Make the Manual Cleaning Process Work

For standard manual warewashing, use five steps: scrape, wash, rinse, sanitize, and air-dry. Precleaning limits the food entering the sink. Washing removes remaining soil. Rinsing removes loosened material and detergent. Sanitizing treats the cleaned surface. Air-drying and protected draining prevent a towel from recontaminating the item. Approved specialized systems can use different arrangements; they are not a reason to merge ordinary sink steps.

Recognize	Understand and apply
Set up the station	The ordinary manual system uses three compartments for wash, rinse, and sanitize, with suitable immersion capacity and dirty/clean holding space. Clean sinks and drainboards before use, as needed during use, and at least every 24 hours when used. Maintain clean working solutions.
Control the wash	Manual wash solution is at least 110 F, or the cleaning-agent label temperature. This is not the temperature for every sanitizer. Check cleaner type, concentration, working time, temperature, mechanical action, water conditions, and access to the soil.
Choose the cleaner	Detergents loosen ordinary food soils; degreasers target grease; delimers are acid cleaners for mineral deposits; abrasives provide scouring action. These practical categories help match the job, but the actual label and surface compatibility control use. Do not combine products.
Inspect before advancing	Food-contact surfaces must be clean to sight and touch. Use appropriate presoak, scrubbing, or disassembly when needed. An abrasive that damages a surface creates a future cleaning problem. Rinse before the routine separate sanitizing step.

Worked decision: the cloudy machine and the greasy pan

Mineral scale may need the equipment's compatible deliming procedure; a greasy pan needs the appropriate grease-removal method. Neither job is solved by increasing sanitizer strength. After cleaning, remove cleaner residues as directed and complete the applicable sanitizing process before food contact.

Remember: Choose the cleaner for the soil, then verify that it worked. The five-step order is a process, not five labels for the same wipe.

4 | Build a Complete Chemical-Sanitizing Check

Use the actual EPA-registered food-contact sanitizing label with the Food Code conditions. Check intended use, concentration, temperature, applicable pH and water conditions, method, contact time, and finishing directions. A shorter Code minimum never overrides a longer label contact time.

Recognize	Understand and apply
Concentration	Parts per million (ppm), expressed as mg/L in the Code's dilute-solution tables, describes working strength. Too weak may fail; too strong may violate permitted use. Measure; odor and color cannot establish concentration.
Time and coverage	Keep every required surface wet for the full applicable process and label contact time. Correct ppm cannot compensate for a brief dip or immediate wipe-off.
Temperature, pH, and hardness	Temperature and pH affect chlorine and iodine conditions. pH describes acidity or alkalinity; hardness describes dissolved minerals and has a specific quat limit. Correct ppm proves neither.
Test the correct solution	Match the test to the chemical and range. The Code requires accurate sanitizer and disinfectant testing and following kit-label directions, including sampling, timing, reading, storage, and any expiration instructions.
Respond to failure	Stop using failed or dirty solution. Correct the cause, prepare compliant solution, and retest. Reprocess inadequately sanitized items. Extra chemical cannot replace cleaning or required contact time.
Label and store separately	Identify each working container by its chemical common name, including disinfectants. Store chemicals separated by spacing or partitioning and not above food, equipment, utensils, linens, or single-use articles. Equipment/utensil cleaners and sanitizers kept in warewashing areas for availability and convenience have a narrow exception only when contamination is prevented.

Worked decision: the wrong strips

Chlorine strips cannot measure quat concentration. Use the correct test before adjusting dilution. Low-range sanitizer strips may also be unsuitable for disinfectant-strength solutions.

Remember: Verify identity, concentration, contact, temperature, applicable water conditions, and cleanliness as separate checks.

5 | Chlorine: Keep the Conditions Paired

Chlorine is not one concentration with one universal time and temperature. First confirm the product's labeled food-contact sanitizing use. Then identify the concentration, pH, temperature, and contact-time combination. The values below describe the standard Code routes; alternative combinations require the applicable demonstrated efficacy and approval, not an employee's guess.

Recognize	Understand and apply
50-99 ppm at pH 8 or below	The minimum solution temperature is 75 F. For example, 75 ppm at pH 7 and 80 F meets this table combination, assuming the other label and process conditions are satisfied.
50-99 ppm above pH 8 through 10	The minimum solution temperature is 100 F. At pH 9, the same 75 ppm solution at 80 F does not meet the standard table. The concentration did not change, but the permitted temperature did.
Other table entries	At pH 10 or below, 25-49 ppm requires at least 120 F, and the 100 ppm entry requires at least 55 F. Do not extend these entries to unlisted concentrations or pH values.
Ordinary contact time	The standard chlorine route uses at least 10 seconds with the required solution conditions, consistent with the EPA-registered label. If the label requires a longer time, use that longer time.
Narrow seven-second provision	At 50 ppm exactly, the Code permits at least 7 seconds when pH is 10 or below and temperature is at least 100 F, OR pH is 8 or below and temperature is at least 75 F. Use must remain label-consistent. This is not a seven-second allowance for the whole 50-99 ppm range.

Worked decision: ten seconds or sixty?

A hypothetical chlorine product requires sixty seconds for the intended sanitizing use. Even a solution that satisfies the Code's seven-second combination must receive sixty seconds under that label. The label requirement remains part of the process.

Remember: Read concentration, pH, temperature, and time as one set of conditions. Never shorten a label contact time to match a memorized Code minimum.

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6 | Iodine and Quats Are Not Chlorine Substitutes by Number

Changing sanitizer requires changing the operating instructions and test method as needed. Do not carry the old ppm setting, strip type, or contact time into a new chemical family. For the standard routes below, follow the EPA-registered label and the applicable Code conditions together. Another validated process is not established simply because a chemical supplier uses a different number in casual conversation.

Recognize	Understand and apply
Iodine concentration and temperature	Use 12.5-25 ppm iodine at a minimum of 68 F. A solution at 20 ppm but 60 F fails the standard temperature condition. Extra contact time alone does not establish an authorized alternative.
Iodine pH and contact	Use pH 5 or below, or no higher than the manufacturer specifies as effective. The standard other-chemical contact route is at least 30 seconds, consistent with the registered label. A longer required label time still applies.
Quat concentration	Use the manufacturer's labeled food-contact sanitizing concentration. Quaternary ammonium compounds, or quats, are not all assigned a universal 200 ppm target. Product-specific concentration belongs on the procedure staff actually use.
Quat water conditions and contact	Minimum solution temperature is 75 F. Water hardness must be 500 mg/L or less, or no higher than the EPA-registered label specifies. The standard other-chemical contact route is at least 30 seconds, consistent with the label. Hardness is not the same measurement as sanitizer concentration.
Other chemical sanitizers	OTHER than chlorine, iodine or quat: use at least 75 F (24 C), unless the EPA-registered label use instructions state otherwise. Follow all applicable label conditions.

Worked decision: the replacement quat

A hypothetical replacement product requires 300 ppm. The old 200 ppm setting cannot be accepted merely because the chemical family is still quat. Verify the new labeled use, test range, temperature, water-hardness allowance, and time. If the water exceeds the permitted hardness, correct the water or use a compliant product process rather than improvising more concentrate.

Remember: Iodine has its own numerical concentration range. Quat concentration comes from the label. Both still need correct temperature, applicable water conditions, and complete contact time.

2026 update for OTHER chemical sanitizers only: the 75 F default applies unless the EPA-registered label states otherwise. **Scored 2022 + December 2024:** this category is label-directed, without that explicit default. Chlorine, iodine and quat retain their separate conditions.

7 | Separate the Heat Measurements

A temperature is meaningful only when the measurement location and process are known. Manual immersion water, machine manifold water, and utensil-surface temperature are different. All equipment must be operated according to its data plate and manufacturer instructions, with correct loading, spray access, cycle timing, and any applicable pressure setting.

Recognize	Understand and apply
Manual hot-water sanitizing	Immerse cleaned utensils for at least 30 seconds in water maintained at 171 F or above. Use suitable heating and a rack or basket for safe complete immersion. The 135 F utensil-holding-water provision is not a sanitizing bath.
Mechanical hot-water result	Utensil surfaces must reach 160 F, measured by an irreversible registering temperature indicator used correctly. A cabinet-air reading, steam, or manifold gauge does not substitute for this surface result.
Fresh rinse at the manifold	The normal minimum is 180 F; stationary-rack, single-temperature machines have a 165 F minimum. The normal maximum is 194 F. The maximum does not apply to the specified high-pressure, high-temperature handheld in-place spraying systems, not to ordinary dishmachines generally.
Chemical machines	Use the machine data plate, cycle instructions, and chemical conditions rather than a blanket 180 F final-rinse rule. Spray-type chemical-sanitizing machines require a wash solution of at least 120 F. Verify actual chemical delivery and concentration with the right test.
Failed verification	Do not release affected utensils as sanitized. Correct the machine, loading, or dosing problem, verify operation, and reprocess items through a compliant procedure. Clean the machine before use, as needed during use, and at least every 24 hours when used.

Worked decision: the reassuring gauge

A normal manifold reading paired with a correctly measured 155 F utensil surface does not pass. Investigate loading, spray, timing, and heat delivery. A surface test and machine operating checks answer different questions; both matter.

Remember: Name the process and measurement point before comparing a reading with its limit.

8 | Protect Tools, Hidden Parts, and Clean Storage

Follow manufacturer procedures and soil conditions for tools, hidden parts, ice equipment, and storage.

Recognize	Understand and apply
Cloths	Hold wet counter cloths in correct sanitizer between uses; launder daily. Separate raw-animal-food cloths. Keep solution free of visible soil and debris; buckets off-floor without contaminating supplies. Dry service-spill cloths stay dry, for that purpose only. Disposable wipes follow their label.
Brushes, sponges, and mops	Keep maintenance tools from contaminating food equipment. Dry-cleaning tools for dry non-TCS residues are reserved for that purpose. Sponges may not touch cleaned and sanitized or in-use food-contact surfaces. Position used mops to air-dry without soiling walls, equipment, or supplies; keep mop water and tool washing out of food-prep, handwashing, and warewashing sinks.
Hidden parts and condition	Expose removable food-contact parts safely according to instructions. Clean can-opener cutting assemblies, slicer guards, and seams; sanitize before reuse. Keep opener cutting parts sharp. Resurface boards that cannot be effectively cleaned and sanitized, or discard when resurfacing is not possible.
Ice and beverage equipment	Follow manufacturer cleaning frequencies for ice bins, enclosed ice-maker components, and listed beverage equipment; absent instructions, prevent soil or mold buildup. Clean non-TCS iced-tea dispensers and consumer self-service utensils at least every 24 h; clean self-service dispensers before restocking and when contamination may have occurred. Exception: qualifying dry cleaning of dry non-TCS residues with dedicated tools, not wet tea equipment or slimy ice surfaces.
Drying and storage	Air-dry or adequately drain; do not towel-dry wet utensils. Already air-dried utensils may be polished with a clean dry cloth. Store clean items self-draining, covered or inverted, protected from splash, dust, leaks, and condensation, ordinarily at least 6 inches above the floor. Closed packages on qualifying supports have a limited clearance exception.

Worked decision: clean bowls under a leak
Move bowls from dripping pipes; reprocess contaminated items.

Remember: Inspect hidden surfaces and protected storage.

9 | Respond to Incidents and Make the Schedule Specific

Prepare staff and supplies for the written vomiting/diarrhea response. Use an EPA-registered norovirus disinfectant; symptoms alone do not diagnose the organism.

Recognize	Understand and apply
Control exposure first	Isolate affected areas; protect food and clean supplies. Trained staff follow the written plan and protective-equipment directions for containment, removal, cleaning, disinfection, exposed food, cleanup tools, and employee-health actions.
Disinfect appropriately	When available sanitizers do not control the pathogen, disinfect for specified bodily-fluid contamination, outbreak, or imminent-hazard conditions. Follow EPA-registered surface-use, concentration, and contact-time directions; test concentration with a suitable kit or device.
Restore food-contact use	Rinse food-contact disinfectant with potable water unless its EPA-registered label specifies otherwise. A different no-rinse sanitizing use is not an exception. Complete applicable cleaning, rinsing, and sanitizing return-to-use steps.
Write a usable master schedule	As house practice, list items/hidden parts, frequency or trigger, responsible position, tools/products, method, verification, and correction. Use the actual rule, manufacturer instructions, or approved exception. Keep specific documentation requirements distinct.
Include nonfood-contact soil	Clean equipment exteriors and undersides to prevent soil buildup, microbial transfer, and pest harborage. These nonfood-contact surfaces do not have a universal four-hour sanitizing schedule.

Schedule example: cooking equipment and microwaves

Cooking/baking food-contact surfaces: clean at least every 24 h. Hot-oil cooking/filtering equipment may instead follow a regulatory-authority-approved schedule based on equipment use, food, residues, and temperature. Microwave cavities/door seals: clean at least every 24 h using the manufacturer's recommended procedure; no hot-oil exception.

Remember: Control the incident hazard, follow the written response, and verify safe return to use.

CHAPTER 12 | REMEMBER THE DIFFERENCE

Clean First. Then Use the Right Treatment.

Soil removal, sanitizing and disinfection are not synonyms.

A correct product used for the wrong job does not finish the work. Every required step and condition has to be met before food-contact items return to use.

Manual sequence	Scrape/preclean, wash, rinse, sanitize, air-dry. Cleaning removes soil. Sanitizing treats an already-clean food-contact surface. Adequate draining before food contact is permitted as specified; do not towel-dry.
FOUR is an interval, not a grace period	Ordinary TCS-contact items: clean at least every 4 hours during use. Relevant task changes or possible contamination require earlier cleaning. Sanitize before reuse. Conditional longer intervals require their exact circumstances.
Sanitizer vs. disinfectant	The 2026 Code requires disinfection when available sanitizers do not control pathogens of concern in specified circumstances. A routine bucket is not automatically adequate for a vomiting/diarrheal event. Use the written response procedure and suitable labeled product.
Strength + conditions + time	Use correct concentration, temperature, applicable pH/hardness, full surface contact and label contact time. Stronger is not automatically better. Match test strips to the chemical and range; odor cannot measure ppm.

Use it on shift: A raw-chicken board has been used for only ten minutes when the cook wants it for lettuce. Reset it now; four hours is not permission to carry raw contamination into the next task. Manage affected food separately.

Cover the answers. Explain the reason.

Does the right ppm prove the job is done? No. Soil, inadequate wet contact, wrong temperature or a missed label condition can still cause failure.

After disinfection, is a food-contact rinse needed? Rinse with potable water unless the EPA-registered label specifies otherwise; complete the required restoration process.

Review: earlier guide pp. 1-4, 8-9. **Sources:** 4-601.11; 4-602.11; 4-703.11; 4-901.11; 2-502.11; Part 4-10, 4-302.14 and 4-501.116.
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CHAPTER 12 | REMEMBER THE DIFFERENCE

Heat Numbers: Water vs. the Utensil

171 is the manual bath. 160 is the machine utensil surface.

Say the measurement point out loud before using a number. Data plates, operating instructions, loading and the complete process still apply.

Manual hot-water sanitizing	After cleaning, immerse utensils in water at least 171 F for at least 30 seconds. Water at 135 F for between-use utensil storage is not this sanitizing process.
Mechanical hot-water result	Utensil surfaces must reach 160 F, measured with a suitable irreversible registering temperature indicator. A manifold display or visible steam does not prove that surface result.
Machine rinse at the manifold	Ordinary fresh hot-water final rinse: at least 180 F. Stationary-rack, single-temperature machine: at least 165 F. Normal maximum: 194 F, with the specified special-system exception. These are not food cooking limits.
Chemical family changes the numbers	Iodine: 12.5-25 ppm, at least 68 F, and its pH/label conditions. Quat: labeled concentration, at least 75 F, and applicable hardness. OTHER than chlorine, iodine or quat: at least 75 F (24 C), unless the EPA-registered label states otherwise. Standard iodine/quat contact is at least 30 seconds; longer label requirements control.

Use it on shift: The dishmachine manifold is at its required temperature, but the utensil indicator shows the surface did not reach 160 F. Do not release the affected dishes as sanitized. Resolve the failure and reprocess them.

Cover the answers. Explain the reason.

Can every chemical sanitizer use chlorine's time? No. Chemical families and labeled uses have different conditions. Chlorine also has conditional combinations; use the guide's full table.

Label says 60 seconds; a Code minimum is shorter. Which? Meet the 60-second label requirement, along with all applicable Code conditions.

2026 update: only sanitizers OTHER than chlorine, iodine and quaternary ammonium compounds gain the explicit 75 F (24 C) minimum, unless the EPA-registered label states otherwise. **Scored 2022 + December 2024:** follow the EPA-registered label for this category; no explicit 75 F default is stated. The named-chemical temperature, pH, concentration, hardness and contact-time conditions above remain separate.

Review: earlier guide pp. 5-7. **Sources:** 4-501.111-.114; 4-703.11; 4-302.13(B). Iodine pH, quat hardness and chlorine combinations: guide pp. 5-7.

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