



Maintain

Proper Temperatures

for Food Safety

FOOD PROTECTION CONNECTION



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Keeping food at the correct temperature is vitally important to the safety of food. Time/temperature control for safety (TCS) food held in the temperature danger zone (TDZ), 41°F – 135°F, poses serious risks to consumers.

As you may recall, bacteria have certain requirements for growth and reproduction. These are identified in the acronym FAT TOM: food (i.e., nutrients for growth), acidity, time, temperature, oxygen, and moisture. Control of one or more of these requirements will slow the growth of pathogens. In the foodservice industry, it is not easy to control acidity, oxygen, and moisture. These are typically controls used in manufacturing facilities. Time and

temperature, however, are easy to control in the retail and foodservice industry.

It would be silly to think that there are no bacteria present in food facilities or on food itself. The goal is to keep the bad bacteria to a minimum, keep away from food, and keep them from growing to a level that would cause illness. Bacteria grow in a predictable way. There are four general phases to the reproduction of bacteria: lag, log, stationary, and death.

Generally speaking, when bacteria first enter an environment it takes them a period of time to adjust to their new surroundings. Very little to no growth occurs in the **lag phase**. The bacteria are simply hanging out



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and getting used to their new home. Given the right conditions, the lag phase can last on average about four hours. However, if the temperature becomes more ideal for bacterial growth, like in the TDZ, the lag phase will shorten and bacteria will start to reproduce in less time. That's why we have the four-hour rule in food service. TCS food left in the TDZ for four hours or longer should not be consumed.

The **log phase** is the phase in which, when conditions are ideal, that bacteria will

thrive and reproduce about every 20 minutes. Warmer temperature will speed growth. This growth is exponential, meaning each reproductive event doubles the number of bacteria. For example, if you start out with 100,000 bacteria, in about 20 minutes you will have approximately 200,000 bacteria.

The **stationary phase** is just that, the bacteria begin to use up their resources and are not reproducing; however, they are still living and can cause illness.

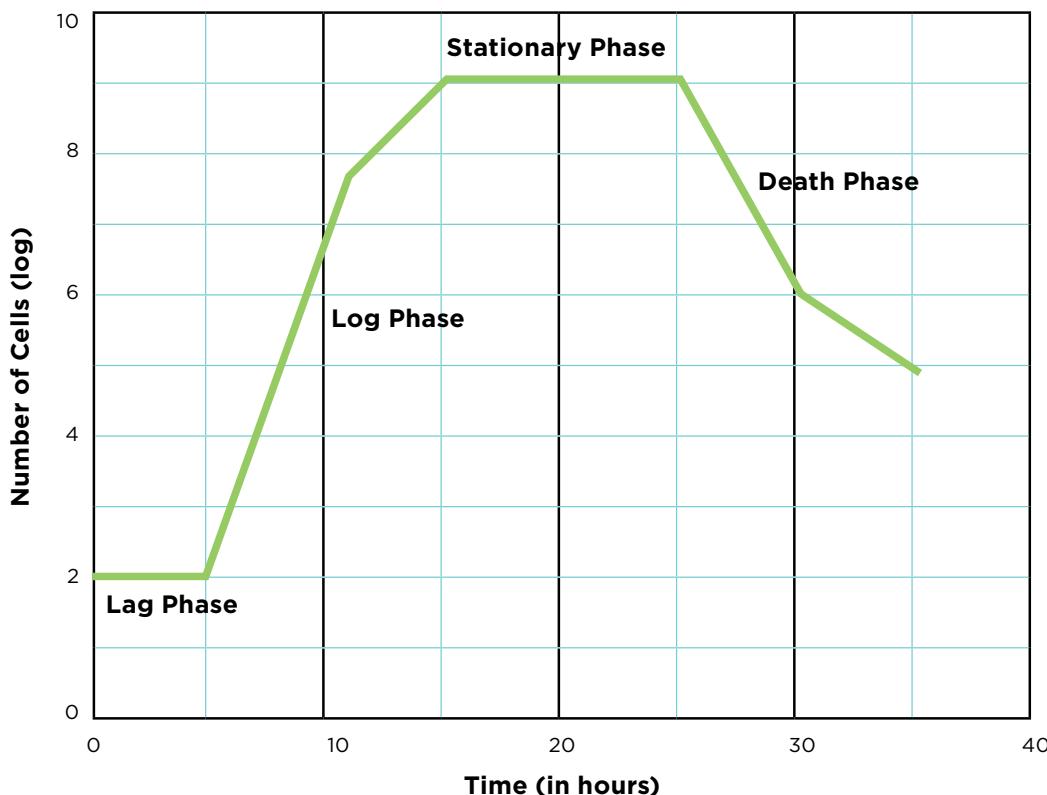
During the **death phase**, bacteria begin to die off due to lack of proper conditions or nutrients.

The goal in the foodservice industry is to keep any bacteria that may be present on food or food contact surfaces in the lag phase or death phase. To keep bacteria from growing on TCS foods, food must be maintained either hot (135°F or above) or cold (41°F or below).

How do we maintain temperature? There are pieces of equipment

Continued on page 12

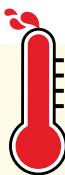
Growth Phases of Bacteria



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Melissa Vaccaro will deliver an education session on 'Survey Readiness and Risk Factors' on June 7 at ANFP's Annual Conference & Expo in Las Vegas. Learn more at www.ANFPonline.org/ACE17

throughout every kitchen that maintain foods hot or cold. This equipment must be monitored and maintained in good working condition.

All TCS foods, except those prepared for immediate consumption by a patron, shall be maintained in such a fashion as to prevent the growth or development of bacteria. Hot-holding equipment must be able to keep foods at a temperature of 135°F or higher, and cold-holding equipment must keep foods at a temperature of 41°F or colder.



HOT-HOLDING GUIDELINES

When holding hot foods for service or transportation, consider the following guidelines:

- Stir the food at regular intervals, as it will help distribute heat evenly throughout the food.
- Keep the food covered, as covering will help retain heat and eliminate potential contaminants from falling into the food.
- Use a clean, sanitized, and calibrated food thermometer to measure the food's internal temperature every two hours and upon delivery. Food should be checked in several locations, but always in the thickest part.
- Discard any hot food after four hours if it has not been maintained at a temperature of 135°F or higher. If found in the TDZ for a period of less than four hours, you can consider a corrective action of reheating the food to 165°F.
- Other safety precautions regarding hot-holding foods include **not** using hot-holding equipment to reheat foods. Many hot-holding units are not manufactured to "cook" foods. Foods to be reheated should first be reheated (recooked) to an internal temperature of 165°F, and then transferred to the hot-holding equipment and held at 135°F or above.
- Consider adjusting the humidity (moisture) of the food holding unit. Some dryer foods are hard to keep hot. Adding humidity can help keep the food temperature above 135°F.
- Transport hot TCS foods in food holding units, coolers, cabinets, and similar that are manufactured to maintain the food at 135°F or above during the entire trip. A thermometer should be provided in each hot holding case. Food should arrive at its destination at 135°F or above. Foods should not be transported or delivered without appropriate equipment to keep the food above 135°F.
- Retain recordkeeping logs when you take temperatures.



COLD-HOLDING GUIDELINES

When holding cold TCS foods for service, the following guidelines can help prevent food-related illnesses:

- Protect all foods from possible contamination by covering them or using food shields.
- Use a clean, sanitized and calibrated food thermometer to measure the food's internal temperature every two hours. Take corrective action whenever the temperature of a cold food item goes above 41°F.
- If held above 41°F for more than four hours, discard the food.
- Never store food items directly on ice. All food items, with certain exceptions, should be placed in pans or on plates surrounded by ice when displayed or in leak-proof containers stored in ice when being transported. Ice used on a display should be self-draining, and all pans and plates should be sanitized after each use.
- Transport cold TCS foods in a proper cooler with a thermometer. If ice packs are used, there should be more ice packs than food. Ice packs are not ideal, but when used in combination with a good cold-holding case, you should be able to keep food out of the TDZ.
- On cold-holding buffet type units, keep an eye on the surface temperature of foods as well as the internal temperature of foods. Stirring the food regularly will help equilibrate the temperature throughout the food.

Document, document, document! Recordkeeping is very important. It is imperative to have written log sheets to record temperatures and corrective actions. This is your proof that you did things right, but no one is perfect, so be sure to record any corrective actions that may have been needed such as reheating or discarding food. Figure 1 shows an example of a temperature log sheet for a refrigeration unit.

BETTER SAFE THAN SORRY

Whenever you are dealing with questionable hot- and cold-holding practices, always resolve the issue in favor of food safety. It is far better to discard TCS foods than risk the health or safety of your customers. ■

SOURCE

1. 2013 FDA Model Food Code

Figure 1: Refrigeration Log

Date/Time	Type of Unit	Location	°F / °C	Corrective Action Taken	Employee Initials	Manager Initials

SAN CE Questions

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1. In which bacterial growth phase do bacteria grow the fastest?
 - A. Lag
 - B. Log
 - C. Stationary
2. What is the TDZ?
 - A. Temperature danger zone
 - B. Temperature discard zone
 - C. Tentative danger zone
3. Hot food should be held at:
 - A. 165°F or above
 - B. 135°F or above
 - C. 120°F or above
4. Cold foods should be held at:
 - A. 50°F or below
 - B. 38°F or below
 - C. 41°F or below
5. It is important that your recordkeeping include:
 - A. The hours of the employee taking the measurements
 - B. Corrective actions taken
 - C. The name of the store owner
6. Bacteria grow _____ when conditions are right.
 - A. Excitedly
 - B. Numerically
 - C. Exponentially
7. If food is in the TDZ for four hours or more:
 - A. Discard it
 - B. Reheat it
 - C. Refreeze it

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