



for SGT Marine - BS/KH

Life Begins at 40°F: How to Use A Seafood-Handler's Thermometer

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Seafoods spoil rapidly, and the requirements for proper handling and storage are considerably more exacting than for other perishable foods. Conditions imposed by nature, and the methods by which seafoods are harvested and handled, only serve to make more difficult the problem of providing high-quality, wholesome products. Careful temperature control is essential in the handling, storage, and distribution of quality seafoods and seafood products.

Fresh seafood handling

Proper handling and temperature control are essential from the time seafood is caught to the time it is prepared, to minimize changes that lower its quality or make it unusable as a food. To a large extent, handling procedures and the length of time seafoods are handled and stored determine to what extent flavor, odor, and texture will change. At best, low temperatures only slow or retard microbial growth and chemical and enzymatic reactions, all of which cause deterioration and spoilage. Of these three types of deterioration, microbial growth is the most important.

The flesh portion of freshly caught seafood is virtually sterile. However, bacterial contamination of the flesh is inevitable as the product is handled, eviscerated, and filleted. These bacteria may die, remain dormant, or grow—depending on their type and the conditions under which the prod-

uct is stored. Although there is a variety of bacteria that exist on these products, lower temperatures markedly reduce the rates at which they reproduce. Good sanitary practices in handling, processing, and storage also help preserve the quality by minimizing the products' level of contamination.

In addition to lowering the quality, improper storage or handling of seafoods can permit the growth of food-poisoning organisms. As temperatures increase above 4°C (40°F), these organisms start to grow at an increasing rate. If storage temperatures are high enough and storage time is sufficient to allow for substantial growth, they can pose a problem serious enough to warrant investigation by public health officials.

Fresh seafoods are also subject to chemical and enzymatic changes during storage; these cause off-flavors, off-odors, and loss of texture.

Such unwanted changes, which are minimized by reducing storage temperatures, affect the proteins and oils of the seafood.

Factors that influence the kind and rate of spoilage

Kind of seafood. Different seafoods and even different species of the same seafood may differ considerably in their acceptability to consumers or in their perishability. Characteristics of the animal, its chemical composition, and even its size, may affect the ultimate quality and reduce the storage life of the product.

Condition. The condition of the seafood at the time of harvest has a decided effect on the acceptability and shelf life of the final product. The quality of water from which it was

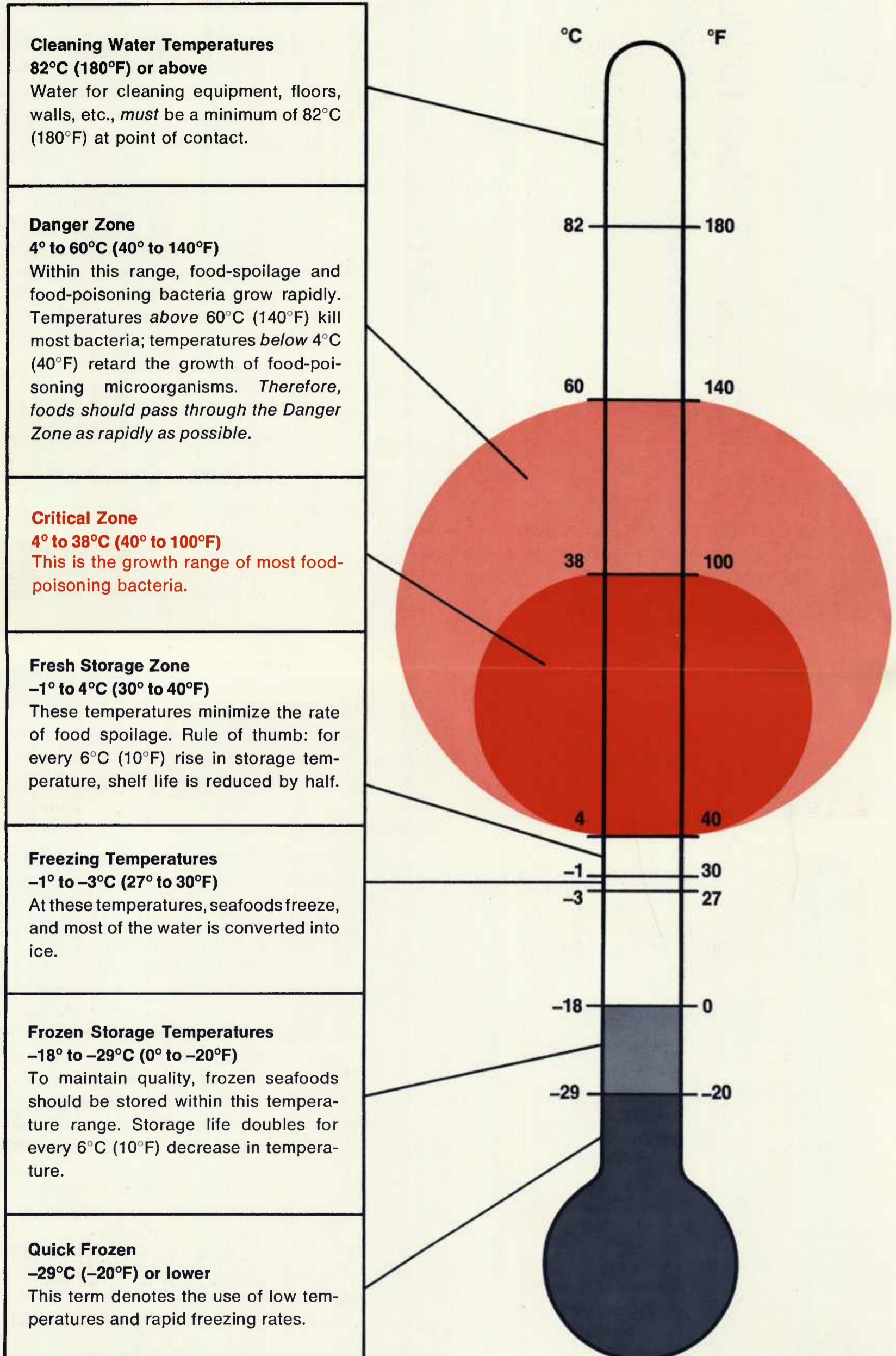
Text continues on page 4; seafood-handler's thermometer, pages 2 and 3



Temperature control is critical. Get an accurate thermometer—and use it!

Seafood-Handler's Thermometer

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Keep it cold!

Keep it clean!

Keep it moving!

taken, the type and amount of feed it had been eating, its phase in the life cycle (molting or reproductive), and even the method of harvesting (trap, net, or line) influence either the product's ultimate quality or its storage life, or both.

Handling after the harvest. Seafoods must be promptly and properly handled aboard ship and throughout processing if the quality of the product is to be maintained. Conditions that lead to crushing, bruising, or any damage to the skin or mucous membranes will reduce the final product's storage life.

Temperature. For all seafoods, the most important agent in preservation is refrigeration, -1° to 4°C (30° to 40°F), which at best only provides limited product life. Refrigeration merely retards deterioration—it cannot prevent it; thus, it must be accompanied by prompt and careful handling from harvest to consumption.

Keep it cold; keep it clean; keep it moving!

Freezing seafoods

Freezing is one of the simplest and most economical methods of seafood preservation. In itself, the process of freezing has no effect on the palatability or nutritional value of seafoods; however, even under the best conditions, freezer storage results in a gradual decrease in the acceptability of the product. Seafoods in frozen storage undergo changes in flavor, odor, texture, and even color. The rate at which these changes occur and the ultimate quality of the product depend on the kind and composition of the fresh product, on the way it was handled in all the steps before freezing, on the type and method of packaging, the manner of freezing, the frozen-storage temperature, and the stability of the storage temperature.

Kind and composition of seafood. Not all seafoods are equally suited to freezing and freezer storage. Structural, compositional, and physiological differences between and within species may influence the texture, flavor, and acceptability of the frozen product. Such changes are usually related to the proteins and oils of the product; generally, seafoods with high oil content and those going through certain physiological changes (reproductive, molting, etc.) have less satisfactory freezing qualities.

Handling before freezing. The ultimate quality of any frozen product depends on the quality of the fresh product. Freezing is only a method of preservation and will not improve inferior or improperly handled products. Deleterious changes already present in the fresh product are often intensified by freezer storage. Consequently, seafoods that are to be frozen must be properly and promptly handled under sanitary conditions and at reduced temperatures.

Packaging. The primary function of packaging is to protect the product from chemical and physical damage. Frozen seafood products lose quality when they are exposed to air (rancidity) or are allowed to lose moisture (freezer burn). To minimize these changes, the products must be wrapped in specially designed materials that will minimize moisture loss, retard oxygen transmission, and resist oil absorption.

To minimize air spaces and voids, the proper packaging material must be tightly wrapped around the product. When products are loosely wrapped or have air spaces in the package, they lose quality because of reactions with the oxygen in this surrounding air and the loss of product moisture to the inside of the package (frost).

A water glaze may be used; it provides some protection from dehydration and the development of off-flavors (oxidation). In most cases, it should be used *in addition* to a packaging material. Areas where the glaze is not present or is cracked are subject to dehydration and the development of off-flavors.

Rate of freezing. Within reasonable limits, the rate at which seafoods are frozen is not a major factor in determining their ultimate quality in the frozen state. Although rapid freezing improves quality, this is a minor factor compared to the effects of storage temperature and packaging materials. The rate at which a product freezes depends on the temperature and on the size, shape, and the exposure of the product.

Precaution should be taken not to overload freezers or to pack the unfrozen product too tightly. Either of these practices can greatly extend the freezing rate of the product and reduce quality.

Storage temperature. Storage temperature is another important factor that influences both storage life and the quality of frozen seafood products. Chemical and enzymatic changes that occur during storage are highly temperature-dependent and are markedly reduced as the storage temperature is lowered. Oil content, again, is significant: the higher it is, the greater the need for consistent low temperature. When possible, the setting for seafoods should be no higher than -18°C (0°F) throughout the storage period.

Stability of storage temperature. The storage temperature of the product should be held as constant as possible. Wide temperature fluctuations cause enzymatic and physical damage, which in turn causes textural and flavor changes.

Keep it cold; keep it clean; keep it moving!

To convert degrees Fahrenheit to degrees Celsius (formerly Centigrade):
subtract 32 and multiply by 5/9.

To convert degrees Celsius to degrees Fahrenheit:
multiply by 9/5; then add 32.

9-75/5M



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