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Northwest Seafood Processors' Glossary

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Washington Sea Grant Marine Advisory Services

NORTHWEST SEAFOOD PROCESSORS' GLOSSARY

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Northwest Seafood Processors' Glossary

Preface

The Seafood Quality Control and Processing Class was begun in 1975 by a group of Northwest seafood processors, the Northwest Laboratory of the National Food Processors Association, and the University of Washington Sea Grant Program. Their primary motivation was to prepare newly hired employees for jobs in the Alaska salmon canneries. The basic goal of the course was then, and still is, to provide new entrants with a broadbrush overview of the Northwest seafood industry.

Although quality control of canned salmon was the original focus of the class, the industry has changed over the years, and as a result, so has the class. The class tries not only to reflect industry changes, but also to anticipate them. Currently, the course is comprised of sixteen 3-hour evening classes, followed by a written examination. A certificate is presented to successful graduates. Lectures concentrate on production methods, quality control methods, procedures, and checkpoints to ensure the production and distribution of wholesome seafoods of consistent quality. Although most presentations are made by representatives of Washington and Alaska seafood processors, representatives of regulatory agencies, suppliers and others closely associated with seafood harvesting and processing also make presentations. Instructors donate their time with their only compensation being the prospect of hiring more knowledgeable and capable employees. Student participants have been bankers, buyers, college students, fishermen, high school teachers, machinists, plant managers, salesmen, seafood brokers, and tendermen. Although the class targets industry newcomers, many seasoned seafood industry people view this course as an opportunity to update or broaden their knowledge of the industry.

The genesis of this glossary was conceived in 1989 by a student in the Seafood Quality Control and Processing Class. Darlene Tiki Couvillion attempted to organize all of the confusing "alphabet soup" terminology and listed the terms in order. Thus the *Northwest Seafood Processors' Glossary* was born.

With regard to the names of finfish, it is suggested that this glossary be used in conjunction with *The Fish List* developed by the U.S. Food and Drug Administration, which provides the legally recognized names for finfish sold in the United States. Since no official marketing list for shellfish sold in the United States exists to date, the *Code of Federal Regulations* is referred to in the appropriate places in the glossary.

This glossary targets the commercial fishing industry and reflects the current terminology used. However, because the industry is constantly evolving and new terms are being added, it is our intention to update the glossary periodically to reflect these changes. Please let us know of changes, additions, and deletions that you feel are appropriate. We hope the glossary will be useful to you.

Teri King and John Peters
Seattle, Washington

Aa

Abalone: The primary harvesting of several species of large wild abalone occurs in temperate waters, whereas the smaller pinto abalone grow and are harvested in colder waters, such as those found in the Pacific Northwest. Recently, significant advances have been made in abalone culture.

Pinto abalone: *Haliotis kamtschatkana* is found in marine waters from Siberia to Central California.

Red abalone: *Haliotis rufescens* is found in marine waters from California to Mexico.

Acid: Chemically, an acid is described as having free hydrogen ions (H⁺), a pH range of 0 to 7, and is characterized as being salty and sour to the taste. Food grade acids are used to alter the pH of foodstuffs to inhibit the growth of microorganisms (see Acidified food). Vinegar is a 5% solution of acetic acid.

Acid detergent: A chemical compound with an acid pH commonly used to remove mineral deposits and water residues in processing facilities. Acid detergents are used primarily in crab processing facilities to remove baked-on protein and mineral deposits.

Acidification: A process whereby a food grade acid is added to lower the pH of a product below 4.6 to prevent the growth of *Clostridium botulinum*. Reducing the pH allows the use of a lower product temperature and shorter product processing time for canned products. Acidification is an important process for delicate foods that may be adversely affected by a long, high temperature process.

Acidified food: A food to which a food grade acid has been added. Acidified foods have a water activity (A_w) greater than 0.85 and a finished equilibrium pH of 4.6 or below.

ADEC: Alaska Department of Environmental Conservation. An Alaska state agency that among other things is responsible for the safety and wholesomeness of seafood products produced in Alaska.

ADF&G: Alaska Department of Fish and Game. An Alaska state agency that among other things is responsible for commercial and recreational fisheries resources.

Aerobes: Bacterial organisms that require oxygen to grow and reproduce.

AFTA: American Factory Trawlers Association, formerly the Alaskan Factory Trawlers Association. An industry association.

AFDF: Alaska Fisheries Development Foundation. A foundation supported by private and public monies to develop seafood resources of Alaska.

Aged ice: Ice that has been chilled below -18°C (0°F). See also Green ice.

Agitation: Physical movement designed to reduce air pockets and bubbles in liquids or semi-solids during canning operations. In association with sanitation programs, agitation refers to a scrubbing action needed to physically release dirt or proteinaceous material from a surface.

Alkaline: Often referred to as "basic," an alkaline solution has extra hydroxyl ions (OH), a pH between 7 and 14, and is characterized as being bitter to the taste and slippery to the touch.

Alkaline detergent: A substance with an alkaline pH used to dissolve proteinaceous material and reduce fat buildup in processing facilities. Alkaline detergents are suitable for removing fish soils on processing equipment and personnel.

Ammonia: Often used as a refrigerant in larger fishing vessels, processing plants, and cold storage facilities. Ammonia refrigerants can be toxic to personnel and can render fish products unfit for consumption if they escape and contaminate seafood.

Anaerobes: Bacterial organisms that grow in an environment free of oxygen.

Analog: A fabricated or engineered food product. "Imitation crab," scallop, and shrimp are examples of analog products made from surimi.

Anisakis simplex: A nematode worm commonly referred to as the *herring worm*, although it can be found in a variety of marine fishes. This parasite can reach a length of 25 mm (1 inch) and is generally white to off-white in color. *Anisakis simplex* can be inactivated by freezing to -35°C (-31°F) for 15 hours or by cooking to an internal temperature of 60°C (140°F) for at least 1 minute.

AQL: Actionable quality level or acceptable quality level.

Aquaculture: The husbandry of aquatic organisms.

ASMI: Alaska Seafood Marketing Institute. An institute supported by private and public monies to promote seafood resources of Alaska.

ASP: Amnesic Shellfish Poisoning. An illness caused by eating shellfish with high amounts of domoic acid.

Attribute: A specific property used as an evaluation tool in assessing the quality of a product, often referred to as a *characteristic*. Attributes generally include: flavor, texture, odor, and color and may also include weight and packaging.

Available chlorine: The amount of active chlorine that a chlorine compound can release into a water system.

A_w: See Water activity.

Bb

Bacilli: A genus of rod-shaped spore-producing bacteria that require oxygen to grow.

Bacteria: Minute organisms visible as individuals only with the aid of a microscope. Bacteria can be found just about everywhere. They are single-cell organisms that usually reproduce by dividing into two equal cells. Bacteria are beneficial in the production of fermented products such as yogurt and sauerkraut, but are generally undesirable in fresh and frozen fish products. To survive, bacteria need water and an energy

source such as proteins, sugars, starches, or fats. Bacteria can be spherical or rod-shaped. Some bacteria are *aerobes* (requiring oxygen); others are *anaerobes* (growing only in the absence of oxygen). Another group of bacteria that can grow with or without oxygen are called *facultative anaerobes*. *Psychrotrophic* (cold-loving), *mesophilic* (medium-loving), and *thermophilic* (hot-loving) are terms used to classify bacteria according to their temperature tolerance.

Bacteriology: The study of bacteria.

Bay scallop: See Scallop.

Bairdi: See Crab.

Beaded can: A can strengthened by reinforcing concentric ribs around the body.

Belon oyster: See Oyster.

Belly burn: An enzymatic reaction in the belly cavity of fish characterized by the reddening of the tissue surrounding the belly cavity. In salmon, severe cases of belly burn and decomposition are readily detected when the rib bones around the belly cavity become separated from the flesh of the belly wall in addition to the reddening of the tissue.

Bioluminescence: A glow produced by naturally occurring, free-living luminous bacteria. Luminous bacteria are not human pathogens.

Black cod: *Anoplopoma fimbria*, more correctly called *sablefish*.

Blast freezer: See Freezer.

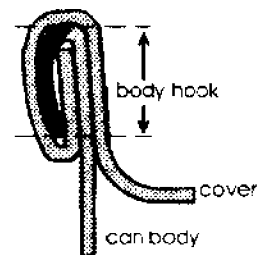
Bleeders: Openings located at the top of a retort to allow entrapped air to be removed during come-up and processing.

Blue mussel: See Mussels.

Bocaccio: *Sebastes paucispinis*, a large species of the rockfish family.

BOD: Biochemical oxygen demand or biological oxygen demand of waste in water effluents.

Body hook: The flange of the can that is turned down during the double seam process to form part of the double seam that interlocks with the cover hook (see diagram).



Bottom seam: Often called the *factory end*, it is the double seam on the bottom end of a 3-piece can. Usually the factory end is put on by the can manufacturer.

Botulism: A rare but often fatal disease caused by a neurotoxin produced by *Clostridium botulinum*. The botulinum toxin may develop in anaerobic environments such as containers of low acid food that have been improperly processed or have leaked after processing.

Break point: The point at which the amount of chlorine added to the water exceeds the chlorine demand of the water.

Break point chlorination: The addition of chlorine in excess of the break point.

Brine: A concentrated solution of salt (NaCl) and water that depresses the freezing point. Often used as a freezing medium for crab, tuna, and other fish products. Brines are also used to cure salmon and herring roe and add flavor to smoked seafood products. The brining of products also helps to prevent the growth of *C. botulinum*.

Brine freezer: See Freezer.

Broker: An outside salesperson who represents, sells, markets, and troubleshoots for a processor. He/she is responsible for making sales presentations and handling problems at the customer's location. A broker works on a commission basis and is paid after the product is sold. Brokers do not take ownership of the product.

BTU: British Thermal Unit. A unit of measure used to describe the amount of heat necessary to raise the temperature of one pound of water 1 degree Fahrenheit. It takes 144 BTUs to melt one pound of ice; or 144 BTU's must be removed to form it. One ton of refrigeration will make one ton of ice in 24 hours—this is equivalent to 288,000 BTUs per day.

Buckling: A can defect caused during the retort operation that results in the permanent distortion of the can end.

Butter clam: See Clam.



Calcium hypochlorite: A sanitizing agent containing chlorine and calcium. When added to the water supply, free chlorine destroys bacteria and alters water hardness. Available in a dry form, calcium hypochlorite is 55 to 70 percent available chlorine.

Calico scallop: See Scallop.

California mussel: See Mussel.

Canned Salmon Control Plan (CSCP): The Canned Salmon Control Plan is based on Hazard Analysis Critical Control Point (HACCP) principles and is a voluntary cooperative agreement between the participating packers, the National Food Processors Association, and the United States Food and Drug Administration.

Carpus: See Crab leg.

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act.

CFR: Code of Federal Regulations.

Champagne ice system: A CSW system in which air is bubbled through a grid of pipes on the floor of the vessel and into a mixture of ice and water to ensure rapid and uniform cooling of the fish.

Characteristic: A statistical tool used to identify products according to species-specific and product-specific attributes.

Check weigher: A machine that weighs products. Automatic checkweighers have the ability to identify those packages that are under or over a specified weight.

Chilling temperature: Ideal chilling temperatures for fresh seafoods are between -1 and 1°C (30 and 34°F).

Chinook salmon: See Salmon.

Chloramine: An organically based chlorine used as a sanitizing agent. Chloramines are slower acting than other chlorine sanitizers, but have a longer lasting effect. Chloramines are nonselective; they attack both Gram negative and Gram positive bacteria.

Chlorination: The process of treating or combining chlorine with water. Chlorination is important in food processing because the chlorine destroys and helps to prevent the propagation of bacteria.

Chlorine: A commonly used sanitizing agent in the seafood industry. Chlorine is used effectively to destroy and prevent the propagation of both Gram positive and Gram negative bacteria and spores. It is relatively economical to use and has little residual action. However, it can be corrosive and can form a toxic gas if combined with an acid. Four common forms are chlorine gas, hypochlorites, chloramines, hypochlorous acid, and chlorine dioxide.

Chlorine demand: The difference between the amount of chlorine added to a water system and the amount of residual chlorine remaining at the point in the water system farthest from the chlorine injection point. The demand for chlorine varies according to the amount of organic matter and nitrogenous material present in the water, the amount of chlorine applied, the length of contact with the water, and the temperature of the water.

Chlorine dioxide: A gas similar to chlorine gas in appearance, odor, and bactericidal activity.

Chlorine dosage: The total amount of chlorine added to a water system generally measured as parts per million (ppm). The chlorine dose minus the chlorine demand equals the chlorine residual.

Chlorine gas: A sanitizing agent commonly added to the incoming water supply to kill and to reduce the propagation of bacteria. Chlorine gas is delivered in steel cylinders. Advantages of chlorine gas over other forms of chlorine sanitation are that it does not raise the pH of the water or add any other chemicals such as calcium or sodium to the water. As with other chlorine sanitizers, gaseous chlorine is effective against both Gram negative and Gram positive bacteria. Chlorine gas is extremely toxic. Do not mix acids with basic chlorine sanitizers.

Chlorine residual: The chlorine residual is equal to the chlorine dose minus the chlorine demand.

Chuck: Part of the closing machine that acts as an anvil and supports the can cover and can body against the pressure of the seaming rolls during the seaming operation.

Chum salmon: See Salmon.

Ciguatera poisoning: A type of poisoning associated with reef fishes that have ingested toxic plankton. The diagnosis of ciguatera poisoning is difficult because symptoms vary between individuals and there are no tests for measuring ciguatera in humans. Typically the

symptoms are not debilitating although paralysis and death may occur in a few *extreme* cases. In the diagnosis phase, laboratories are only useful in ruling out other diagnoses such as neurotoxic shellfish poisoning, paralytic shellfish poisoning, scombroid poisoning, and *Clostridium botulinum* toxins. Ciguatera poisoning is not a problem with local Northwest fishes, only tropical reef fishes.

Clam: Commercially important molluscan shellfish species in the North Pacific include the littleneck or steamer clam, butter clam, cockle, razor clam, geoduck, and manila clam.

Butter clam: *Saxidomus giganteus*

Cockle: *Clinocardium nuttallii*

Fat gaper clam: *Tresus capax*

Geoduck: *Panopea abrupta*

Littleneck clam: *Protothaca staminea*, also referred to as the steamer clam

Manila clam: *Tapes japonica*, sometimes referred to as a steamer clam

Pacific gaper clam: *Tresus nuttalli*

Razor clam: *Siliqua patula*

Claw arms: See Crab leg.

Claw pincers: See Crab leg.

Cleaning: The removal of soil from a given area.

Clincher: A machine used in canning operations that loosely attaches the can end to the can body before a vacuum is formed and the end is double seamed.

Closing machine: Also known as the double seamer. The closing machine forms the double seam and seals the can end to the can body.

***Clostridium botulinum*:** Anaerobic spore-forming bacteria that are capable of producing a deadly neurotoxin. *C. botulinum* produces an odor in only about 20 percent of contamination cases. Therefore, the absence of odor does not necessarily indicate that an inadequately processed product is safe for consumption. The thermal process is calculated by processing authorities to kill *C. botulinum*.

Cocci (singular, coccus): Spherically shaped bacteria.

Cockle: See Clam.

COE: U.S. Army Corps of Engineers. A federal agency that, among other things, maintains the navigable waters of the United States.

Coho salmon: See Salmon.

Coliform bacteria: A bacteria present in sewage used to indicate the presence of pathogens of sewage origin. Fecal coliform bacteria indicate the presence of fecal material and are a type of coliform bacteria.

Come-up period: The time lag between the introduction of steam into the retort and the time when the retort reaches the required processing temperature.

Commercial sterility: Used to describe food products and their packaging materials that have been rendered free of microorganisms of either public health significance or those microorganisms capable of reproducing under normal conditions of handling, storage, and distribution.

Compressor: A pump that when used in refrigeration systems increases the pressure of the gaseous refrigerant and moves it to the condenser.

Concentration: The amount of material, such as detergent or salt, in a volume of water. There is an important relationship between concentration, contact time, and temperature in the effectiveness of soil removal during cleaning.

Condenser: A heat exchanger that when used in refrigeration systems cools the hot refrigerant gas, condenses it to a liquid, and returns it to the receiver.

Conduction heating: The transfer of heat from one particle to another without movement of the particles. Fish flesh heats by conduction.

Contact time: The amount of time one substance is in contact with another. Example: a sanitizer in contact with a cleaned surface or chlorine with water.

Container integrity examination report: Filled out by canned warehouse personnel at the end of the label order or code to indicate the quantity of cans run and defects found.

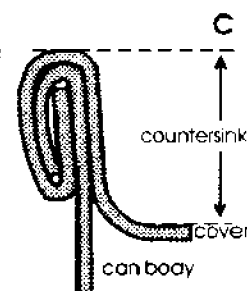
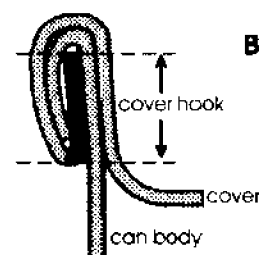
Convection heating: The transfer of heat from one particle to another a gas or liquid circulating and mixing with particles. Chowders generally heat by convection.

Conveyor: A mechanical conveyance used to move product from one area to another. Conveyors may be belts, rollers, or slides.

Cover curl: The edge of the can cover or end that is turned inward after the end is formed and before it is double seamed (see diagram A).

Cover hook: The interlock formed during the double seaming operation by the cover curl and the can flange (see diagram B).

Countersink: The depth measurement from the top of the double seam to the end panel adjacent to the inside wall of the double seam (see diagram C).



Crab: Commercially important species in the North Pacific and Bering Sea include the king crab, Tanner or snow crab, and Dungeness crab. Crab are caught in pots and are delivered to the processing facility alive. For approved market names of crab, refer to 21 CFR part 102.50.

Dungeness crab: *Cancer magister* is harvested from California to the Aleutian Islands.

Korean hair crab: The hair crab (*Erimacrus isenbeckii*) has been commercially fished in the Bering Sea since 1979. The hair crab fishery is incidental to the Tanner crab fishery from March to June. The majority of the hair crab catch is sold live to Japanese fish markets.

King crab: There are three species of king crab commercially harvested in the North Pacific and Bering Sea: red (*Paralithodes camtschatica*), brown (*P. brevipes*), and blue (*P. platypus*). Another commercially important species that was called king crab until recently is the golden crab (*Lithodes aequispina*).

Tanner crab: Generically referred to as the snow crab, Tanner crab refers to four species of crab that inhabit the North Pacific and Bering Sea. Two of the Tanner crabs are commercially targeted species. *Chionoectes bairdi* is the larger of the two targeted species and *C. opilio* is the smaller. *Bairdi* became an important commercial species after the decline of the king crab in the 1970s. The other two species of Tanner crab, *C. tanneri* and *C. angulatus*, are caught in lesser quantities.

Crab leg:

Carpus: A segment of the walking legs or claw arms of crabs located between the merus and propodus. Counting from the dactylus or tip, the carpus is the third segment of the leg.

Claw arms: The segments (shoulder, merus, carpus) that combine to support the pincers of crabs.

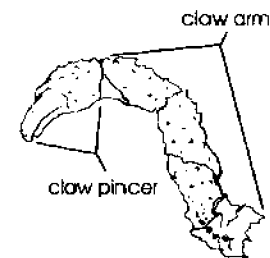
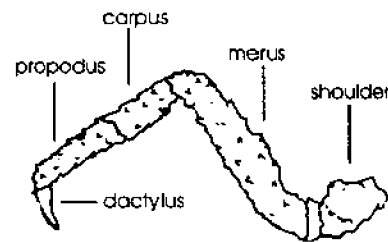
Claw pincers: The combination of the dactylus and propodus that forms a pincer and is attached to the claw arm.

Dactylus: The farthest segment from the body on the walking or claw leg of a crab.

Merus: The largest segment of the crab leg or claw arm located between the carpus and shoulder.

Propodus: The segment of crab legs or claw arms located between the dactylus and carpus.

Shoulder: The body segment of crab walking legs or arms that is usually attached to the body during processing.



Critical defect: Any defect that causes a product to be unsuitable for its intended use; for example, a container that is leaking or shows evidence of having lost its hermetic seal.

Critical factor: Any property, characteristic, or condition that when varied may affect the scheduled process of a heat-processed product, the attainment of commercial sterility, or the intended use of the product.

Cross-contamination: Contaminating any product with microorganisms from another source. Usually occurs when mixing cooked product in any proportion or manner with

raw product, non-potable water, or any instrument or agent that has been in contact with raw products, or unsanitized equipment and materials.

Cross-over: The portion of the double seam at the side seam-double seam juncture.

Cryogenic freezers: See Freezers.

Cryoprotectants: Food grade chemicals such as phosphate, sugar, or sorbitol added to products to protect them from damage during freezing and cold storage. In the surimi process, cryoprotectants are added to bind excess moisture and improve the frozen storage capabilities of the product.

CSW: Chilled sea water, a simple type of refrigeration system comprised of water and ice that is used on fishing vessels, tenders, and at processing facilities. See also Slush ice, Champagne ice system, RSW.

Curd: The creamy coagulation of water-soluble proteins caused by heating. Curd is frequently found in canned salmon, cooked crab, and smoked fish.

Cut seam: A fracture or cut of the double seam, most frequently occurring at the cross-over or juncture.

CWA: Clean Water Act; also called the Federal Water Pollution Control Act (FWPCA).

Dd

Dactylus: See Crab leg.

Damaged end curl: Physical damage to the end curl that results in the flattening of the can curl alongside the can body instead of interlocking with the body hook. Also known as a *knock down curl*.

Dead head: Also referred to as a *spinner*, *skidder*, *skip*, or a *slip*. Dead heads are incomplete seams as a result of the can slipping on the chuck during the seaming operation. Dead heads are most commonly found just after the machine is started up and are often due to overlubrication.

Death phase: A period during which more organisms are dying than reproducing.

Decomposition: The breakdown of material into its component parts. Food decomposition, by FDA's definition, has three organoleptically identifiable stages:

Class 1: (Passable) This category includes fishery products that range from fresh to those that contain fishy odors or other odors characteristic of the commercial product, not definitely identifiable as decomposition.

Class 2: (Decomposition—slight but definite) The first stage of identifiable decomposition. The product has a persistent, perceptible odor of decomposition and is unacceptable for human consumption.

Class 3: (Decomposition—advanced) The product has a strong, persistent, distinct, and unmistakable odor of decomposition and is unacceptable for human consumption.

Defects: Flaws detected in seafood products and packages. Canned seafood defects are categorized as critical, major, or minor. Critical defects are cans that leak. Major defects have the potential of becoming leakers. Minor defects are cosmetic problems that do not affect the integrity of the can. Defects in fresh and frozen seafoods include bruises, scars, improper cuts, watermarking, softness, improper cleaning, off-color, and off-flavor. In steaks and fillets, defects include irregular cuts, thickness, trimming, parasites, bones in boneless items, etc. according to the appropriate specification.

Dehydration: The loss of moisture from tissue resulting in a dry, porous, or spongy condition. Frequently dehydration results in the oxidation of the surface tissues.

Department of Health (DOH): A Washington State agency formerly combined with the Department of Social Services as the Department of Social and Health Services. Responsible for safety and wholesomeness of food products sold at retail stores in Washington State.

Descaler: Machinery or person that removes scales from fish. When fish enter a commonly used mechanical descaler, they rotate around an abrasive drum that removes the scales.

Detergent: A cleansing agent that loosens soil. See Surfactant, Acid detergent and Alkaline detergent.

Diphyllobothrium spp: A tapeworm associated with freshwater and anadromous fishes that can cause parasitic infection if ingested. Most commercial cooking and freezing processes inactivate this parasite.

Direct sales: The system of a company using its employees to contact and sell to customers. This sales method eliminates middlemen and brokerage charges.

DO: Dissolved oxygen.

Domoic acid: See ASP

Double seaming: The process that forms a closure by tightly interlocking the cover curl with the flange of the can body. The double seam is formed in a two-step operation and has five layers of metal, (three from the cover and two from the body). The first operation forms the seam and the second operation flattens, tightens, and squeezes the metal together.

Dressed fish: A gutted fish. Following are a list of terms used to describe dressed fish:

Eastern cut: A fish with head, guts, collar, and pectoral fins removed

H&G: A fish with head and guts removed

Princess cut (or G & G): A fish with head on, gills and guts removed

Round: A whole fish

Western cut: A fish with head off and guts removed

Droop: A droop is a smooth downward projection of the double seam. Droops are frequently caused by foreign material in the seam or too much sealing compound in the curl. They can be detected by visual inspection.

Dry chlorine: See Chloramine.

Dud detector: A machine that is designed to identify and reject low vacuum containers.

Ee

Eastern cut: See Dressed fish.

Egg shell crab (soft shell crab): A crab that has recently undergone a molt and whose shell has not hardened. Egg shell crabs have clean and unblemished shells, but are easily damaged in live transport and usually contain a less than desirable percentage of meat.

EIR: Establishment Inspection Report: Prepared by the FDA investigator at the conclusion of an inspection.

EIS: Environmental Impact Statement.

End: Can cover, either top or bottom.

Enterotoxin: A toxin specific to the intestine that can cause food poisoning symptoms.

EPA: Environmental Protection Agency. The federal agency that is primarily responsible for the protection of the environment.

ESA: Endangered Species Act.

Escherichia coli: A short Gram negative rod in the coliform family that is found naturally in the gut of warmblooded animals. *E. coli* does not survive well in fresh or salt water or under low temperatures. It is commonly used as an indicator of fecal contamination.

Evaporator: The evaporator in a refrigeration or freezing system is that part of the system where the liquid refrigerant, that has passed through the expansion valve, absorbs heat from the product and returns it to the vapor state.

Expansion valve: The valve in freezing and refrigeration systems that reduces the high pressure liquid refrigerant to a lower pressure liquid so it can absorb heat to form a lower pressure gas.

Ff

F value: A term used in thermal processing calculations that relates to the time required to destroy a specific number of microorganisms at a defined temperature.

Factory end: The manufacturer's or bottom end of the can.

Facultative anaerobes: Microorganisms that can grow in an environment with or without oxygen.

False seam: A condition in which the cover hook and the body hook do not interlock. This defect can not always be seen by a visual examination.

FAO: Food and Agriculture Organization of the United Nations.

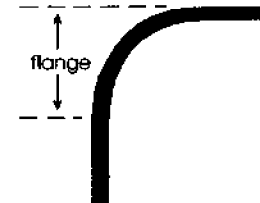
FDA: See USFDA. The federal agency that, among other things, is responsible for assuring the safety and wholesomeness of foods in interstate commerce.

FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act.

Fill weight: The amount of product put into a container before processing or sealing. The fill weight does not include the brine or liquid filled with the product or the weight of the container.

Fillet: A fish portion produced by cutting a fish along the backbone from nape to tail, separating the two sides. Generally, the fins, collar, neck, and belly bones are removed.

Flange: The unseamed edge of the can body that is flared outward. During double seaming, the flange becomes the body hook (see *diagram*).



Flat irons: The extreme flattening of one side of a fish while being frozen. The condition generally results from flesh that is too soft to support the weight of the fish.

Flat sour: Thermophilic microorganism spoilage in canned foods. The thermophilic organisms produce low levels of acid that cause souring but not gas.

Fluorescence dye: An identifying dye that fluoresces under UV light—most commonly used as a trace chemical to detect leaks in sanitation systems. Fluorescence dye is also used to denature fish products, other than canned products, not fit for human consumption.

Fold test: A test to help determine the quality of surimi.

Food additive: A substance or mixture of substances, other than the basic food product, that is intentionally present in a food.

Food infection: A medical condition resulting from eating foods containing pathogenic bacteria that have multiplied after ingestion by the consumer.

Food intoxication: A medical condition resulting from consuming foods containing bacterial toxins.

Food spoilage: The degradation of product quality due to chemical, microbiological, or physical changes. Often called deterioration.

FPI: Food Processors Institute. The educational arm of the National Food Processors Association.

Fracture: See Cut seam.

Freezer: A mechanical system designed to rapidly remove heat from food products to protect the quality of those products and to increase their storage time. Several types of refrigeration and freezing systems are used in the seafood industry. System selection generally depends on the shape and size of the product, anticipated volume and duration of harvest, seasonality of harvest, and the physical constrictions of the installation facility.

Blast systems: A type of freezer in which very cold air is blown at high speed over and around the product. Blast freezing rooms are insulated and equipped with fans to circulate chilled air over products laid on trays and racks. Potential problems are "hot spots" that may develop in areas of low air flow.

Cryogenic systems: Cryogenic systems use very low temperature refrigerants such as liquid nitrogen or carbon dioxide to rapidly freeze products.

Immersion or brine systems: Immersion freezers circulate a cold liquid, approved for food contact, over the product. It is important that the liquid have good heat transfer characteristics, low viscosity at low temperatures, and not adversely alter the flavor, texture, color, or appearance of the product.

Plate or contact systems: Plate freezers, both vertical and horizontal, are commonly used to freeze products in rectangular blocks. In plate freezers, products are laid between two plates that compress the product. Both plates have refrigerant circulating through them.

Freezer burn: Loss of moisture (usually surface moisture) in a product during freezing or subsequent storage. Freezer burn can cause white spots, or a gray/brown discoloration to form on the product surface, and initiate or accelerate oxidative changes in the product.

Freezing: The removal of heat from a product resulting in the changing of water in the product from a liquid to a solid state. See also, Latent heat of fusion.

FSIS: Food Safety and Inspection Service, a division of USDA.

FWCA: Fish and Wildlife Conservation Act.

Gg

Gastroenteritis: An inflammation of the stomach/intestinal lining. It can be caused by ingesting foods containing large numbers of bacteria such as *Vibrio* spp. and/or *Yersinia enterocolitica*. These bacteria can rapidly multiply and cause diarrhea, abdominal pain, cramps, vomiting, headache, and or fever.

Gel strength: The water binding capacity of a given product—an attribute of great importance in analog quality.

Geoduck: See Clam.

Glaze: A coating of liquid frozen onto previously frozen product to prevent dehydration of the product while in cold storage. Typically, a sugar solution of about 5% is used to add flexibility and reduce cracking and flaking of the glaze during handling. Evaluating the amount of glaze on a product is accomplished by subtracting the weight of the de-glazed frozen seafood from the weight of the glazed product. The Association of Official Analytical Chemists (AOAC) and the U.S. Department of Commerce (USDC) have specific guidelines for conducting glaze tests for many products.

GMP: USFDA Good Manufacturing Practice (regulation); refer to 21 CFR part 110. Current good manufacturing practice in manufacturing, packing, or holding human food.

Gooseneck barnacle: *Pollicipes polymerus*

Gram negative: A bacteria that does not stain when exposed to the purple dye associated with Gram's method.

Gram positive: A bacteria that absorbs the purple dye associated with Gram's method.

Graveyard crab: A crab that has not molted for the past several seasons and is heavily scarred with barnacles and other encrusting organisms.

Green ice: Ice that has not aged but is just at or very slightly below the freezing temperature and begins melting quickly when put on warm fish. Green ice is sometimes referred to as *wet ice* or *young ice*. See also Aged ice.

Growth phase: A period in which organisms are growing faster than they are dying.

Hh

H & G: See Dressed fish.

HACCP: Hazard Analysis Critical Control Points. A concept of process control and inspection that defines potential areas of risk and develops monitoring procedures to check performance at those points. The HACCP system consists of three major concepts:

- 1) identification and assessment of hazards associated with growing, harvesting, processing, marketing, preparing, and using raw materials or food products,
- 2) determination of critical control points to control any identifiable hazard,
- 3) establishment of systems to monitor critical control points.

Hake: *Merluccius productus*, a North Pacific species also known as Pacific hake.

HANA: Halibut Association of North America. An industry association that promotes the halibut products of North America.

Hand dips: Sanitizing solutions for use by employees to dip their hands or gloves in to reduce the number of bacteria prior to and during processing. A 25-ppm iodophor solution is commonly used for hand dips.

Hermetically sealed container: A container of plastic, metal, or glass that is designed to prevent the entry of microorganisms and maintain commercial sterility of its contents after processing.

Histamine: See Scombroid poisoning.

Honeycombing: The presence of numerous discrete holes of various sizes throughout the tissue of a fish. Honeycombing is generally caused by improper handling and cooling of fish. Honeycombing due to protein breakdown may be an indicator of histamine problems. Generally more evident in large fish such as halibut, tuna, or swordfish.

Hydrophobic: Literally, water-hating. Products that resist absorption of water.

Hydrophilic: Water-loving. Products that readily absorb water.

Hypochlorite: A form of chlorine available either as liquid sodium hypochlorite or dry calcium hypochlorite and frequently used as a sanitizer. Calcium hypochlorite changes the hardness of the water. Hypochlorites are stronger and faster acting than chloramines.

Ii

Ice: Frozen water. Widely used to maintain quality and freshness of seafoods. Flaked ice is often preferred for chilling finfish because it has a larger surface contact area and it does not damage the texture of the fish as much as is possible with other forms of ice. There are many shapes and forms in which water is frozen for use. Thin layers of water frozen on the surfaces of products is known as glazing.

Idiotfish (Idiots): Two species of edible rockfish are commonly called idiotfish, *Sebastes alascanus* and *Sebastes altivelis*.

Ikura: Salted salmon roe screened to give single eggs.

Importer: A direct buyer of foreign products and a supplier for the domestic market.

Incipient spoilage: Product spoilage that occurs in sealed containers prior to processing.

Integrity sheet: See Container integrity examination report.

Iodophor: A modified iodine sanitizer that releases free iodine into the water. Generally, iodophors have rapid germicidal action and are effective against both Gram negative and Gram positive bacteria. They are commonly used for hand dips because they are mild to the skin. They may stain slightly. Iodophors should not be held above 38°C (100°F) because heat destroys the iodine complex. Iodophors do not inactivate spores as effectively as chlorine based sanitizers. To avoid neutralizing the iodophor solution, caution should be used to ensure that alkaline detergents are completely rinsed away before the acidic iodophor is added. Iodophors should not be used with any products containing starch. The combination of iodine and starch results in an objectionable, persistent blue color.

IPHC: International Pacific Halibut Commission. A federal group sponsored by Canadian and American monies to regulate halibut fishing. This is a scientific group with regulatory but no enforcement powers.

ISSC: Interstate Shellfish Sanitation Conference.

Ij

Japanese oyster: See Oyster.

Jump seam: A double seam characterized by loose wrinkles adjacent to the juncture of the seam as a result of the second operation roll "jumping" over the side seam.

Kl

Kazunoko: Herring roe salted as whole egg skeins.

King crab: See Crab.

Korean hair crab: See Crab.

Kype: The hooked bottom jaw that male salmon develop as they prepare to spawn.

Ll

Latent heat of evaporation (vaporization): The amount of heat necessary to change a liquid into a gas or a gas into a liquid without a change in temperature.

Latent heat of fusion: The amount of heat necessary to change a solid into a liquid or a liquid into a solid without a change in temperature.

Letter of credit (L/C): A document issued by an importer's bank informing the exporter that the buyer has money to cover the purchase. Occasionally, letters of credit are mistakenly thought of as a guarantee for the importer because the L/C enumerates the specifications of the product.

Listeria monocytogenes: A bacteria that occurs naturally in the environment, grows well in cold, damp environments, at pH values greater than 5.0, and can survive in high salt concentrations and brine freezers. These bacteria can be destroyed by thorough heating of the product to at least 63°C (145°F). Contamination of ready-to-eat-seafoods occurs when a cooked product comes into contact with a contaminated raw product or unsanitary materials.

Littleneck clam: See Clam.

Lot: That amount of product, produced during a specific time period, by a method of process, product type, or species that is identified by a specific code.

Low acid food: A food with a finished equilibrium pH greater than 4.6 and a water activity greater than 0.85.

Low acid canned food regulations: Refer to 21 CFR, part 113. Thermally processed low-acid foods packaged in hermetically sealed containers.

Lox: Single fillets of salmon that have been lightly cold smoked after brining in a salt and sugar solution. Before cold smoking, it is essential that salmon be thoroughly frozen to eliminate parasite problems. A variation of the lox process is known as the Nova Scotia or Nova process.

Mm

Manila clam: See Clam.

Market broker: A broker who lives in the same geographic area as his customers and has personal contact with customers, stores, and buying offices.

Medium: In microbiology, a combination of water and nutrients used by bacteria to grow and reproduce.

Mercury-in-glass thermometer: The official temperature monitoring instrument for the thermal processing of foods.

Merus: See Crab leg.

Mesophilic bacteria: Bacteria that can grow in the range from 16 to 43°C (60 to 110 °F). Most food poisoning bacteria grow in this temperature range.

METRO: Municipality of Metropolitan Seattle. A city agency that, among other things, is responsible for water quality within the metropolitan Seattle area.

Microbiology: The study of microorganisms.

Micrometer: A precision tool designed for making very small measurements. A seam micrometer is used to measure double seam dimensions to $\pm 1/10,000$ of an inch.

Microorganism: An organism such as a bacterium or protozoan. Because of their extremely small size, a microscope must be used to see individuals. When growth conditions are favorable, individual organisms multiply and become visible as colonies or slimes.

Misassembly: A condition in which the can end and the can body do not engage properly. The problems of misassemblies are attributed to improper timing in the double seaming process. Knocked down flanges and damaged cover curls are examples of misassemblies.

Mold: Multi-celled filamentous fungus whose growth on foods is recognized by a fuzzy or cottony appearance. Mold may often be an indicator of poor sanitation and cleanliness of equipment.

Molting: A process in which crabs and other crustaceans shed their shell and form a new larger one so the animal can grow and increase in size. Molting leaves the animal vulnerable until the newly formed shell has hardened. During this time, the flesh is thin and watery.

MPRSA: Marine Protection, Research and Sanctuaries Act (Also called the Ocean Dumping Act).

MSDS: Material Safety and Data Sheets. These contain essential information about the potential hazards of individual chemicals and what actions need to be taken if an emergency arises involving the chemicals.

Mussels: The commercially important molluscan shellfish species in the North Pacific are the blue or bay mussel although the California mussel is commonly consumed by recreational gatherers.

Blue mussel (or bay mussel): *Mytilus edulis*

California mussel: *Mytilus californianus*

Nn

Nanophyetus salmincola: A parasitic tapeworm associated with freshwater and anadromous fishes, commonly known as the salmon poisoning fluke. Parasitic infection is most common in animals such as dogs, raccoons, and bears.

Native oyster: See Oyster.

NEPA: National Environmental Policy Act.

Net weight: A declaration of the net quantity of the product in the package, exclusive of the wrapper, container, packaging material, or any other material packed with the product such as juice or water.

Neurotoxic shellfish poisoning: Caused by the consumption of filter feeding shellfish contaminated with brevetoxins. A common problem in the Gulf of Mexico. These toxins produce a gastroenteritis that will clear up in a matter of days.

NFI: The National Fisheries Institute is an industry association representing many of the seafood processors in the United States.

NFPA: The National Food Processors Association is an industry association representing many of the food processors of the nation. The NFPA Northwest Laboratory administers the Canned Salmon Control Plan in conjunction with the USFDA.

NMFS: The National Marine Fisheries Service is the primary federal agency, under NOAA, broadly responsible for the marine finfish, shellfish, and mammal resources of the United States.

NOAA: The National Oceanic and Atmospheric Administration is a federal agency under the Department of Commerce whose mission is to "describe and predict changes in the earth's environment, manage the nation's ocean and coastal resources, and promote global stewardship of the world's oceans and atmosphere."

Nova: See Lox.

NPDES: National Pollution Discharge Elimination System.

Oo

Off-odors: Odors of a fish that when compared to a freshly harvested fish of the same species definitely are not indicative of good, fresh product. Off-odors include sour, rancid, stale, ammonia, petroleum products, or other objectionable odors indicative of contamination or decomposition.

Olympia oyster: See Oyster.

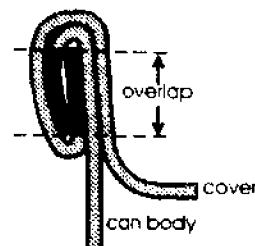
Opillo: See Crab, Tanner.

Optimum growth temperature: The temperature range at which a particular microorganism grows most rapidly or produces the greatest numbers of cells or fermentation products.

Organoleptic analysis: The sensory evaluation of a food product on the basis of color, flavor, odor, texture, or other characteristics.

OSHA: Occupational Safety and Health Administration. A federal agency responsible for safe working environments and conditions. See also WISHA.

Overlap: The amount that the cover hook and body hook of the finished can seam overlap. Overlap is a critical dimension of the double seam (see diagram).



Oysters: Commercially harvested along the Pacific Coast from aquaculture operations and some wild sets. The dominant species produced along the West Coast is the Pacific or Japanese oyster.

Belon oyster: *Ostrea edulis*.

Native oyster (Olympian oyster): *Ostrea lurida*.

Pacific oyster: *Crassostrea gigas*

Ozone: Ozone is a chemically altered form of oxygen (O_2). Ozone can be made when an oxygen molecule, O_2 , is broken into its two components (O^{**} and O^{**}) and then combines with another oxygen molecule (O_2) to form ozone (O_3). Besides acting as a shield to block atmospheric ultraviolet radiation, ozone has industrial application as a sanitizer.

Pp

Pacific ocean perch (POP): *Sebastes alutus*.

Pacific oyster: See Oyster.

Panelling: A can defect in which the sides of the can body are permanently drawn inward.

Parasite: Any organism living in or on another organism without benefit to its host. The four parasites associated with seafoods that may cause harm to humans if ingested alive are *Anisakis simplex*, *Pseudoterranova decipiens*, *Diphyllobothrium spp.*, and *Nanophyetus salmincola*.

Pasteurization: A heating process that raises the product core temperature sufficiently high to kill or inactivate pathogenic bacteria.

Pathogenic bacteria: Bacteria that produce disease in humans, animals, and/or plants.

PCOGA: Pacific Coast Oyster Growers Association. An industry association that promotes Pacific Coast shellfish products.

Pea crab: *Pinnotheres maculatus*. A small crab occasionally found living inside of mussels and clams.

pH: A term that describes the acidity (0 to 7 pH) or alkalinity (7 to 14 pH) of a solution or product. pH is based on a log scale with each whole number representing a 10-fold increase (or decrease) to the next higher (or lower) number.

Phenolic compound: A bactericide. Not recommended for use in fish harvesting, handling, or processing facilities because of the very persistent disagreeable odor and flavor it imparts to the product.

Pink salmon: See Salmon.

Pink scallop: See Scallop.

Pinto abalone: See Abalone.

Plate freezer: See Freezer.

Pollock: *Theragra chalcogramma*, recommended common name Walleye pollock, marketed as Alaskan pollock.

Potable water: Water that meets public health standards and is suitable for drinking.

Pressure ridge: The impression around the inside of the can body formed by the chuck during the double seaming operation. The pressure ridge should be visible and continuous and is an indication of the tightness of the finished double seam.

Princess dressed: See Dressed fish.

Private label broker: A broker who sells products for use under a buyer's own label.

Process: In the food industry, a process refers to a particular method of handling product and converting it to a more finished form. Although the methods used for any particular species or product may be similar, there are generally variations between facilities. See also Scheduled process.

Process deviation: In a thermally processed food, a change in any critical factor of the scheduled process that reduces the sterilizing value of the process, or introduces doubt about the attainment of commercial sterility. In non-heat-processed foods, a process deviation is one in which the process procedures were not followed and/or the product failed to meet specifications.

Propodus: See Crab leg.

Pseudoterranova decipiens: A parasite found in marine fishes commonly referred to as the cod worm. If eaten alive *P. decipiens* can embed in the lining of the intestine causing extreme discomfort. However, *P. decipiens* can be easily killed by heating to 60°C (140°F) for one minute or freezing at -35°C (-31°F) for 15 hours.

PSP: Paralytic shellfish poisoning. Results from humans eating shellfish (mussels, clams, oysters, scallops) that have accumulated toxin from a dinoflagellate known as *Alexandrium catenella* (formerly *G. catenella*). To find out if a beach area in the state of Washington is affected by PSP, call the PSP hotline number (1-800-562-5632). For other states contact the local health department.

PSPA: Pacific Seafood Processors Association. An industry association comprised primarily of shore-based processors.

PSWQA: Puget Sound Water Quality Authority. An agency responsible for coordinating and conducting research on Puget Sound.

Psychophile: Bacteria that are capable of growing at temperatures below 0°C (32°F), but whose optimum growth range is 10 to 20°C (50 to 68°F). The bacteria in this classification generally cause off-flavors in refrigerated foods.

Psychrotroph: An organism that can grow at 5°C (41°F) or less, but with a maximum temperature tolerance higher than the psychophilic bacteria.

Pugh: Generally a single-tined pitch forklike implement that once was commonly used to transfer fish. Double- and triple-tined pughs were also used. In general, their use is strongly discouraged because of the physical damage they cause to the product and because they introduce spoilage or pathogenic bacteria into the fish flesh. Pughing fish is prohibited under Alaska regulations and the Canned Salmon Control Plan.



Quality: The features or attributes that make something what it is. Quality attributes may be conceived differently dependent upon individual needs, desires, and uses. Buyers generally define quality as the adherence to specifications.

Wholesomeness means the food is fit to eat. It is the minimum acceptable quality level at which a food may be considered suitable for consumption as defined by state and federal regulations.

Market quality varies according to the preferences and demands of buyers and consumers.

Intrinsic quality of the product is determined by the physical condition of the product at the time it is harvested, and is affected by species, size, sex, stage of maturation, and other physiological characteristics.

Extrinsic quality of the product is determined by the methods employed in the harvesting, handling, processing, and storing of the fish and the subsequent microbial and enzymatic activity in the fish. Proper handling can result in a product with a high extrinsic quality, whereas improper handling can result in a low extrinsic quality.

Quaternary ammonia compound (Quats): A family of colorless, noncorrosive sanitizers that effectively destroy Gram positive bacteria, are mild to the skin, and have good residual action when compared to chlorine-based sanitizers and iodophors. Quats should not be used in conjunction with chlorine compounds because the chlorine and ammonia gases can combine, causing toxic gases.

Quick freeze: A process whereby the product is frozen in a very short time. Quick freezing is desirable in seafood products because the small ice crystals formed cause less damage than do the large ice crystals that are formed during slow freezing.

Dr

Rancidity: The result of exposing fish fats to oxygen. Fatty fish will generally oxidize more rapidly than lean fish. The rate of oxidation is directly proportional to the temperature, the chemical structure of the fats, and the availability of oxygen. Oxidation odors and flavors are objectionable to most people.

Razor clam: See Clam.

Recovery (or yield): The amount of usable product that is available for sale after all processing has been completed. Recovery is usually expressed as a percentage of the weight of the saleable product recovered after processing divided by the raw product weight before processing.

Red abalone: See Abalone.

Refrigerant: R717 (ammonia), R12, R22 and R502 (freons) are all commonly used refrigerants in the seafood processing industry. Refrigerants are circulated through a refrigeration system and absorb heat from the product.

Rejection insurance: Insurance commonly purchased when seafood products are imported into the United States. The insurance protects the buyer from losses incurred should the product be rejected for reasons enumerated in the policy.

Residual chlorine: Chlorine remaining in solution after a specified period of contact with the water being chlorinated. Chlorine dose minus chlorine demand equals residual chlorine. Also known as chlorine residual.

Retort: A closed container or vessel used for thermal processing of filled containers of food products under steam pressure.

Rigor mortis: A biochemical condition that all animals pass through sometime after death and that is readily noticeable by a stiffening of the muscles. It is an important stage because the speed at which the fish undergoes rigor mortis and the length of time in which the fish is in rigor influence the product quality.

Rock scallop: See Scallop.

Round: A whole fish, not dressed or eviscerated.

RSW: Refrigerated sea water, a type of refrigeration system that uses mechanical refrigeration systems to chill the sea water and is most often used by tenders and processing facilities. See also CSW.

Rust: The yellow to brownish discoloration caused by oxidation of the oils in fish tissue. A problem common in the salt fish industry. Can be caused by salt-tolerant bacteria if salt is reused.

Ss

Salmon: There are five species of Pacific salmon commercially harvested in the North Pacific and Bering Sea: chinook, coho, chum, pink and sockeye.

Chinook salmon: *Oncorhynchus tshawytscha*

Chum salmon: *Oncorhynchus keta*

Coho salmon: *Oncorhynchus kisutch*

Pink salmon: *Oncorhynchus gorbuscha*

Sockeye salmon: *Oncorhynchus nerka*

Salmon poisoning: See *Nanophyetus salmincola*.

Salmonella: *Salmonella* is a genus of bacteria ubiquitous in distribution and found naturally in the digestive tract of humans and other animals. These bacteria can cause severe food poisoning which lasts from 1 to 7 days. They are pathogenic bacteria associated with foods that do not compete well with many of the other bacteria. The optimum temperature range for *Salmonella* is between 35 and 37°C (95 and 99°F) and optimum pH range is 6.5 to 7.0. *Salmonella* can survive freezing.

Sanitation: The act of removing or controlling with sanitizers, those microorganisms on work surfaces after fish, blood, slime, and other soiling materials have been washed away.

Sanitizing agents: Chemicals used to kill bacteria after removing soiling materials from processing equipment and areas. Three commonly used sanitizers in the seafood industry are chlorine, iodophors, and quaternary ammonium chloride compounds.

Scallop:

Bay scallop: *Argopecten irradians*

Calico scallop: *Argopectin gibbus*

Pink scallop: *Chlamys rubida*

Rock scallop: *Crassadoma gigantea*

Sea scallop: *Placopecten magellanicus*

Spiny scallop: *Chlamys hastata*

Weathervane scallop: *Patinopecten caurinus*

Scheduled process: The scientifically calculated thermal process providing a minimum time and temperature required to ensure commercial sterility of a product, packed in a specific manner, in a specific size, and in a hermetically sealed container. Scheduled processes are required by law and must be posted in a conspicuous location in the thermal processing area. They may be obtained from such recognized processing authorities as NFPA.

Scombroid poisoning: Caused by the ingestion of fishes with high histidine contents such as tuna, bonito, mackerel, and mahi mahi. If these fishes are not adequately refrigerated immediately after capture, the bacteria living on the fish convert the amino acid histidine to histamine. Histamine can cause a variety of symptoms but can usually be counteracted by the consumption of antihistamines. Scombroid poisoning can be differentiated from ciguatera poisoning because of its rapid (from minutes to hours) onset and resolution. Fishes with large reserves of histidine can be easily tested in plant facilities using chemical assays. See also Honeycombing.

Screw press: A cylindrical screen press with an internal press used to remove excess water from a product. It is commonly used in the manufacture of surimi and fish meal.

Sea scallop: See Scallop.

Sealing compound: A resilient rubber-based compound placed in the curl of the can end. The compound helps to fill minor voids after the mechanical seal is made. Sealing compounds cannot correct for mechanical errors.

Seafood broker: A broker specializing in the sale of seafood products. See also Broker.

Sensible heat: The heat energy that is characterized by a change of temperature and is perceptible to human senses. In terms of sensible heat, liquid water has 1 BTU per pound per °F while ice has 1/2 BTU per pound per °F. Solids have 1/5 BTU per pound per °F.

Shall: A word that when used in food processing regulations implies mandatory compliance.

Shelf-stable: Products that will not grow bacteria or undergo spoilage when held under normal storage conditions at ambient temperatures.

Should: A word that when used in food processing regulations implies that a recommendation ought to be followed.

Shoulder: See Crab leg.

Skip molt: A crab that has not molted for at least one year. The shell on these crabs is dark and scarred and may contain barnacles and sea lice. Although the meat of the crab may be suitable, the cosmetically poor shell condition results in a lower value. See also Graveyard crab.

Slow freezing: An undesirable freezing process in which the desired core temperature of the product is reached after the product has been placed in the freezer for a long time (3 to 72 hours depending on the size and shape of the product.) A slow freeze results in the formation of large ice crystals in the cell. Large ice crystals cause damage to the tissue cells which leak upon thawing, resulting in lost weight and reduced quality.

Slush ice: An extremely simple form of CSW refrigeration using a mixture of ice and seawater.

SMA: Washington Shorelines Management Act.

SMP: Shoreline Master Program.

Snow crab: See Crab.

Sockeye salmon: See Salmon.

Sodium hypochlorite: A sanitizing agent that adds sodium as well as chlorine to the water supply altering water hardness. Sodium hypochlorite can be purchased as common laundry bleach (5.25% sodium hypochlorite) or industrial strength (up to 12.5% sodium hypochlorite).

Soft-shell crab: See Egg shell crab.

Spoilage bacteria: Bacteria that live and grow in a foodstuff and undesirably alter the texture, flavor, and composition of it.

Spore: A shell coating formed by bacteria to resist extreme heat, desiccation, and chemicals. Sometimes referred to as a resting stage because when environmental conditions are suitable for the organism to grow, the bacteria will again reproduce.

SPC: Statistical Process Control: A statistical method for monitoring processes on a continuous basis to reduce variability in the final product.

Spiny scallop: See Scallop.

SGC: Statistical Quality Control. A statistically systematic and scientific method for collecting, analyzing, and interpreting process data to assure quality.

Sterilization: A process that kills all bacteria. See also Commercial sterility.

Struvite: Glasslike crystals of magnesium ammonium phosphate that can form in canned food products. These crystals form naturally during the thermal processing of some seafood products. Although they look like broken glass, struvite crystals are a natural and harmless substance that are easily crushed by finger pressure and readily dissolved in water and a weak acid such as vinegar.

Sublimation: The process by which ice is transformed directly from a solid to a gas without passing through a liquid state. Frozen foods subjected to temperature fluctuations can sublime, resulting in a dry, cottony product. Generally the results of sublimation are referred to as dehydration or freezer burn. The maintenance of constant cold storage temperatures, proper packaging, and/or adequate glazing can prevent sublimation.

Sujiko: Salted, whole, unbroken salmon egg skeins or roe sacs.

Surfactant: A chemical that binds water and oil together. Sometimes referred to as a wetting agent.

Surimi: Washed, minced flesh combined with cryoprotectants. Surimi made from fish is used in seafood analogs and fish cakes.

Tt

Tanner crab: See Crab.

Temperature abuse: The warming of products above their recommended storage temperatures. Products that have been subjected to temperature abuse may not necessarily exhibit visible signs of decomposition, deterioration, or spoilage. External clues to temperature abuse are accumulations of snow at the back door of the truck container or the inside surfaces of the cartons or packages, deformed cartons, or indications of previously wet packing cartons.

Tenders: Boats used to transport fish from a catcher vessel to a processing facility.

Thermal death time: The amount of time required to destroy specific bacteria in a specific food product in a specific container at a given temperature. This information is used as a basis for a scheduled process. See F value.

Thermophile: Bacteria that grow best at temperatures between 43 and 66°C (110 and 150°F). Destruction of thermophiles requires a long process time at a high temperature.

TOSCA: Toxic Substance Control Act.

Trader: A type of seafood broker who buys and takes ownership of products.



USCG: U.S. Coast Guard. A federal agency responsible for, among other things, navigation and vessel safety.

USDA: U.S. Department of Agriculture. Generally responsible to Congress for administering food safety and food protection laws in the animal meat and poultry industries.

USDC: U.S. Department of Commerce. A federal department that oversees, among other agencies, NOAA and NMFS.

USFDA: United States Food and Drug Administration commonly referred to as Food and Drug Administration or FDA. The mission of the FDA is to enforce laws enacted by Congress and regulations promulgated by the agency to protect the consumer's health, safety, and pocketbook. These laws include: the Federal Food, Drug, and Cosmetic Act and the Fair Packaging and Labeling Act. All seafood products fall under the jurisdiction of FDA.

USFWS: U.S. Fish and Wildlife Service. A federal agency that, among other things, is responsible for the endangered species act.



Viable bacteria: Bacteria that are capable of proliferating.

Vibrio: A genus of Gram negative bacteria generally associated with the marine environment. Most raw seafoods consumed in the summer will have at least one strain of *Vibrio*. *Vibrio* can be destroyed by thoroughly heating seafoods and avoiding contamination after cooking.



Vibrio cholerae: A species of *Vibrio* that can produce a potent enterotoxin when held under the proper conditions and cause cholera disease. *V. cholerae* are associated with fecal contamination and are spread primarily through contaminated water supplies and poor sanitation. *V. cholerae* cause gastroenteritis, the symptoms of which appear within 6 hours to 5 days after ingestion of the contaminated food. The recovery period is from 2 to 12 days after ingestion. To prevent the spread of *V. cholerae* contamination, harvest shellfish from approved and uninfected waters and chlorinate the processing water. Normal cooking temperatures will destroy this *Vibrio*, and it is important not to recontaminate the food after cooking.

Vibrio hollisae: A species of *Vibrio* that lives in salt and fresh water. Only recently (1982) discovered by scientists, these bacteria have been associated with raw oysters and cooked seafoods. They cause self-resolving gastroenteritis.

Vibrio parahaemolyticus: A species of *Vibrio* found in the marine environment and whose populations bloom during the warm summer months. *V. parahaemolyticus* can withstand temperatures down to 5°C (41°F) and up to 60°C (140°F). The onset of food-borne gastroenteritis is between 4 and 96 hours and recovery generally takes 3 days. Thoroughly heating the product and avoiding cross contamination will prevent the spread of these bacteria.

Vibrio vulnificus: These bacteria are naturally found in seawater and can be acquired through wound infection. As with *V. parahaemolyticus*, populations of *V. vulnificus* increase under warm water conditions. *V. vulnificus* is also associated with seafood, most notably raw oysters. A toxic response to the ingestion of *V. vulnificus* will be seen within 12 hours. *V. vulnificus* causes soft tissue infections, blood infections, and often fatal liver damage. Adequate cooking will destroy these bacteria.

Ww

Water activity (A_w): The amount of free moisture in a product. Water activity is not the same as moisture content. Water activity measurements are usually not conducted in the field because of the high instrument costs; however, they can be routinely run by an analytical laboratory.

Watermarks: Skin discoloration associated with salmon as they return to fresh water to spawn. The watermark is an indication of sexual maturity in the fish. All species of salmon can be watermarked.

WDA: Washington Department of Agriculture. A state agency responsible for the health and safety of foods produced in Washington State. Aquaculture products are included under this agency.

WDF: Washington Department of Fisheries. A state agency responsible for commercial and some recreational fisheries in Washington State.

WDW: Washington Department of Wildlife. A state agency responsible for recreational game fishes in Washington State.

WDNR: Washington Department of Natural Resources. A state agency responsible, for among other things, tideland leases.

WDOE: Washington Department of Ecology. A state agency involved with fisheries and water quality issues in Washington State.

Weathervane scallop: See Scallop.

Western cut: See Dressed fish.

WISHA: Washington Industrial Safety and Health Act. Washington's version of OSHA, responsible for safe working environments and conditions.

WRAC: Western Regional Aquaculture Center. A federally supported center that sponsors research and education to address the needs of aquaculture problems in the western region.

WBG: Washington Sea Grant. A federal program focusing on research, education, and advisory services to solve local, regional, and national marine issues.

WV7



Yeast: A single-cell microorganism that reproduces by budding. Yeasts are used in fermentation processes to convert sugars into alcohols and gas such as in breadmaking. Yeast also plays a role in some primitive fish preservation procedures. Some yeasts behave like molds.

Yersinia enterocolitica: A Gram negative rod bacteria that can produce a heat-stable enterotoxin. *Y. enterocolitica* is found in salt and fresh water, soil, warm- and cold-blooded animals, dairy products, vegetables, and fruits. It causes gastroenteritis, which may be manifested several days following ingestion of the contaminated food. The temperature range is 0 - 44°C (32 - 111°F), optimum temperature is 32°C (90°F), range is 4.4 to 9.5, and optimum pH is between 7.6 and 8.0. *Y. enterocolitica* can be destroyed in 1 - 3 minutes at 60°C (140°F) but it is resistant to freezing.

Northwest Seafood Processors' Glossary

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