

Glossary of Terms Applicable to Process Recommendation Letters

Acid Food – A food that has a natural pH of 4.6 or below.

Acidified Food – Low-acid food to which an acid(s) or an acid food(s) is added and which has a finished equilibrium pH of 4.6 or below and a water activity greater than 0.85. See next entry for the regulatory definition.

Acidified Low Acid Product – A canned product which has been formulated or treated so that every component of the finished product has a pH of 4.6 or lower within 24 hours after the completion of the thermal process unless data are available from the establishment's processing authority demonstrating that a longer time period is safe. (9 CFR 318.300 or 381.300)

Agitating Cookers - Retorts or cookers that provide product agitation during processing.

a_w – The symbol for **Water Activity**, a measure of the available water in a food.

Alternate Process - A process which is not used routinely, but may be used to correct a potential deviation situation.

Ball Formula Method - A method used by processing authorities to calculate a process schedule or to evaluate a process deviation.

B_b – Symbol often used to represent the **Process Time**.

Carriers - The part of the container-conveyor chain that holds a stick of containers in a fixed place during movement through the hydrostatic retort system.

Centimeters/Second (C/S) – The units of measure for some viscometers used to measure the consistency of a product.

Centipoise (CPS) – The units of measure for some viscometers used to measure the viscosity of a product.

Come-Up-Time (CUT) - The time in minutes (including venting time if applicable) from the moment the retort is turned on (sometimes called steam on) until the retort reaches the required processing temperature.

Commercial Sterility - Condition when equipment and containers are free of viable microorganisms of public health significance as well as those of non-health significance which are capable of reproducing under normal conditions of storage and distribution. May also be referred to as **Shelf-Stability**.

Consistency - Thickness or viscosity of a product.

Container-Conveyor Chain - Conveyor that moves the containers through the hydrostatic retort system.

Cooker - Another name for a retort.

Critical Factor - Any property, characteristic, condition, aspect or other parameter, variation of which may affect the scheduled process delivered and thus the commercial sterility of the product. This does not include factors which are controlled by the processors solely for purposes of product appearance, quality, and other reasons which are not of public health significance.

CUT – See **Come-Up-Time**.

Drained Weight – Usually the weight of the product particulates after processing. It does not include the weight of the container or covering liquid.

Direct Heating – A means of heating product involving direct contact between the heating medium (steam) and the product. This is a term used in aseptic processing.

Discharge Leg - Part of a hydrostatic retort through which the containers pass after leaving the pressure section.

Equilibrium pH – pH of the finished product. May be referred to as **Finished Equilibrium pH**.

F_o – The time in minutes required at 250°F to destroy a population of test microorganisms having a z value of 18°F. Or the number of equivalent minutes at 250°F delivered to a container or unit of product calculated using a z value of 18°F. Also referred to as the **Sterilizing** or **Lethality Value**.

Feed Leg - Part of a hydrostatic retort through which the containers pass before entering the pressure section.

Filling Temperature - Temperature of product at the time a container is filled.

Fill Weight – The weight of the product particulates before processing. It does not include the weight of the container or covering liquid.

Finished Equilibrium pH - pH of the finished food.

General Method - A method used by processing authorities to calculate a process schedule or to evaluate a process deviation.

Gross Headspace - The vertical distance between the level of the product (generally the liquid surface) in an upright rigid container and the top edge of the container (i.e., the flange of an unsealed can, the top of the double seam on a sealed can that has been opened, or the top edge of an unsealed jar).

Headspace – That portion of a container not occupied by the product. Will be a **Gross Headspace** or a **Net Headspace**.

Heating Factors – Values used by a processing authority to calculate a process schedule. The values represent the heating rate of a product. Common terms used for heating factors are j , f_h , f_2 , x_{bh} and g_{bh} .

Heating Medium - The means of transferring heat to the containers in the retort. Examples of types of heating medium include steam, water immersion, cascading water, water sprays and steam/air mixture. May also be called **Processing Medium**.

Hold Tube – The section of the aseptic system where the product is held at the sterilization temperature for the required sterilization time. This term is used in aseptic processing.

Hydrostatic Retort - A retort in which pressure is maintained by water legs; it operates at a constant steam temperature while containers are continuously conveyed through it for the required process time.

Indirect Heating – A means of heating product in which the product and heating medium are physically separated. This term is used in aseptic processing.

IT or Initial Temperature - The average temperature of the contents of the coldest container to be processed at the time the sterilization cycle begins. Will be a minimum value.

Laminar Flow – Flow occurring when adjacent layers of fluid move relative to each other, forming smooth streamlines, without macroscopic mixing. This term is used in aseptic processing.

Low-Acid Foods - Any food (other than alcoholic beverages) with a finished equilibrium pH greater than 4.6 and a water activity (a_w) greater than 0.85.

Maximum Drained Weight – Weight of the solid portion of the product after it has been processed and after draining the covering liquid for a specified time with the appropriate sieve.

Maximum Equilibrium pH – For acidified foods, the highest finished product equilibrium pH after processing.

Mercury-In-Glass Thermometer (MIG) - Reference instrument which indicates retort temperature.

Metering Pump – A pump that delivers a precise flow rate of product through an aseptic processing system. Also called a timing pump.

Minimum Health Process - A time and temperature combination needed to inactivate *C. botulinum*

Nesting - Containers which fit within one another when stacked.

Net Headspace - The vertical distance between the level of the product (generally the liquid surface) in an upright rigid container and the inside surface of the lid. (9 CFR 318.300 or 381.300)

NumeriCAL™ Method – A mathematical modeling method used by processing authorities to calculate a process schedule or to evaluate a process deviation.

Operating Process - The process selected by the processor that equals or exceeds the minimum requirements set forth in the scheduled process.

Overpressure - Pressure supplied to a retort in excess of that exerted by steam or water at a given process temperature.

pH - A measure of acidity or alkalinity. Chemically, pH is defined as the negative logarithm of the hydrogen ion concentration.

Packing Medium – The liquid or other medium in which the low-acid or acidified product is packed. For example, for “Vienna Sausages in Beef Broth”, the packing medium is Beef Broth.

Process - Application of heat to foods either before or after sealing in containers for a period of time and at a temperature scientifically determined to be adequate to achieve commercial sterility.

Process Calculation – Mathematical procedure used to determine the adequate process time and temperature for thermally processed foods.

Process Deviation – Whenever the actual delivered process does not satisfy (is less than) the scheduled process or whenever a critical factor requirement is not in compliance with the scheduled process.

Process Schedule – The thermal process and any specified critical factors for a given canned product required to achieve shelf stability (commercial sterility). (9 CFR 318.300 or 381.300) Sometimes referred to as the **Scheduled Process**. This is the minimum process provided by the processing authority.

Process Temperature - The minimum temperature(s) of the heating medium to be maintained as specified in the process schedule. (9 CFR 318.300 or 381.300)

Process Time – The intended time(s) (usually in minutes) a container is to be exposed to the heating medium while the heating medium is at or above the process temperature(s). (9 CFR 318.300 or 381.300)

Processing Authority – The person(s) or organizations(s) having expert knowledge of thermal processing requirements for foods in hermetically sealed containers, having access to facilities for making such determinations. (9 CFR 318.300 or 381.300)

Processing Medium - See **Heating Medium**.

Pure Steam - Saturated steam that is free of air.

Reel Speed – The rotational speed of the reel on a continuous agitating retort. The reel speed determines the process time and the amount of product agitation. May be stated as revolutions-per-minute (RPM) or containers-per-minute (CPM).

Retort - Any closed vessel or other equipment used for thermal processing. May also refer to the act of applying a thermal process to a canned food in a closed pressurized vessel.

RPM – Symbol for revolutions-per-minute. Used to indicate the speed of the reel.

RT or Retort Temperature – The temperature in °F of the retort heating medium in which the containers are processed.

Scheduled Process - The process selected by the processor as adequate under the conditions of manufacture for a given product to achieve commercial sterility.

Shelf-Stability – The condition achieved by application of heat, sufficient, alone or in combination with to the ingredients and/or treatments, to render the product free of microorganisms capable of growing in the product at nonrefrigerated conditions (over 50°F or 10°C) at which the product is intended to be held during

distribution and storage. Synonymous with **Commercial Sterility**. (9 CFR 318.300 or 381.300)

Solid to Liquid Ratio – The weight of the product particulates divided by the weight of the product liquid portion.

Steam Dome - That section of a hydrostatic retort in which sterilization takes place.

Still Retort - A discontinuous (batch-type), non-agitating, vertical or horizontal, enclosed vessel used in the processing of canned foods.

Temperature Indicating Device - A thermometer or other temperature-sensing device that serves as an indicator of the official process temperature.

Temperature/Time Recording Device - An automatic instrument that records time and temperature during the thermal process.

Thermal Process – The heat treatment necessary to achieve shelf stability as determined by the establishment's processing authority. It is quantified in terms of time(s) and temperature(s) or minimum product temperature. (9 CFR 318.300 or 381.300)

Through-put – The number of containers per unit of time that enter and exit a continuous container handling retort. Usually expressed in terms of cans (containers) per minute or CPM.

Turbulent Flow – The type of flow exhibited by nonviscous products where fluid elements move in a random tumbling and churning motion. This term is used in aseptic processing.

Vacuum - A state of pressure reduction below atmospheric.

Venting – The removal of air from a retort before the start of process timing.

Viscosity - The property of resistance to flow in a fluid or semifluid. The scientific term used to define the thickness or consistency of a product.

Water Activity (a_w) - A measure of the free moisture in a product. It is determined by dividing the water vapor pressure of the substance by the vapor pressure of pure water at the same temperature. If applicable, it will usually be listed as a maximum value.

z or z-value – Temperature change (°F) necessary for the D-value to change by a factor of 10 or for one log cycle reduction in a specific microbial population.

Glossary of Terms Associated with Hermetically Sealed Containers

Abnormal Container – A container with any sign of swelling or product leakage or any evidence that the contents of the unopened container may be spoiled. (§318.300 or §381.300)

Abrasion - Damage to semirigid or flexible packages caused by mechanically rubbing, scuffing or scratching.

Base Plate Pressure - The force of the base plate that holds the can body and end against the chuck during the double seaming operation.

Beaded Can - A can that is strengthened by reinforcing ribs or concentric depressions around the body.

Bearing Surface - The portion of the container on which it rests.

Blow Molding - The process of forming a semirigid container by forcing or air-blowing molten plastic into a mold of the desired shape.

Body - The principal part of a container, usually the largest part in one piece comprising the sides. May be round, cylindrical or other shapes.

Body Hook - The flange of the can body that is turned down in the formation of the double seam.

Bottom - The bottom of the container made in the bottom-plate part of the glass container mold.

Bottom Plate Parting Line - A horizontal mark on the glass surface resulting from the matching of the body mold parts and the bottom plate.

Bottom Seam - The double seam of the can end put on by the can manufacturer. Also known as factory end or can manufacturer's end.

Buckling - Defect in the can resulting in a permanent distortion of the end; caused by excess pressure inside the can.

Burnt Seal - A discolored area of the seal due to overheating.

Can Manufacturer's End - See **Bottom Seam**.

Canner's End - See **Cover**.

Can, Sanitary - Full open-top can with double seamed bottom. The cover or top end is double seamed after filling.

Cap Tilt - A defect in the application of the PT (Press on – Twist off) cap. The cap should be essentially level with the transfer bead or shoulder, not cocked or tilted.

Capper Vacuum Efficiency - Ability of capper to produce vacuum in a sealed container.

Channel Leaker - A patch of non-bonded area across the width of the seal creating a leak.

Chuck - Part of a closing machine that fits inside the end countersink and acts as an anvil to support the can cover and body against the pressure of the seaming rolls.

Closing Machine - Machine that assembles the end to the can body by double seaming. Also known as seamer or double seamer.

Closure - Another name for cover, seal, lid, end or cap.

Closure Lug - Found only on lug twist caps. Fits under glass thread for security.

Cocked Base Plate - A base plate that is not parallel with the seaming chuck resulting in a body hook uneven in length.

Cocked Cap - A cap which is not level due to the cap lug or thread failing to seat under glass thread.

Cocked Cap Detector - Special equipment designed to detect and reject faulty containers.

Code Lot – All production of a particular product in a specific size container marked with a specific container code. (§318.300 or §381.300)

Cold-Water Vacuum Test - Method of checking capper vacuum efficiency.

Compound - A sealing material consisting of a water solvent dispersion of rubber placed in the curl of the can end. The compound aids in forming a hermetic seal by filling spaces or voids in the double seam.

Container Integrity - A reference to the visual condition of any container and its hermetic seal.

Continuous Thread - Continuous spiral of a glass ridge around the finish for at least one full turn. The same term applies to metal ridge in the cap which matches with the glass thread.

Corner Leaker - A leak occurring in one of the corners of a paperboard package.

Countersink Depth - The measurement from the top edge of the double seam to the end panel adjacent to the chuck wall.

Cover - The end applied to the can by the packer. Also known as top, lid, packer's end or canner's end.

Cover Hook - That part of the double seam formed from the curl of the can end.

Critical Defect - A defect that provides evidence that the container has lost its hermetic condition or evidence that there is, or has been, microbial growth in the container's contents.

Crossover - The portion of a double seam at the juncture with the lap or side seam of the body.

Crushed Lug - Lug on cap forced over glass thread causing cap lug not to seat under glass thread.

Curl - The extreme edge of the end or cap that is turned inward after the end is formed.

Cut Code - A fracture in the metal of a can end due to improper embossing.

Cut-Over - A break in the metal at the top of the inside portion of the double seam.

Cut-Thru - Gasket damage caused by excessive vertical pressure.

Deadhead - An incomplete seam resulting from the chuck spinning in the end countersink during the double seaming operation. Also known as a spinner, skidder or slip.

Delamination - A separation of the laminate materials which affects appearance but not the hermetic integrity.

Double Seam - The closure formed by interlocking and compressing the curl of the end and the flange of the can body.

Droop - A smooth projection of the double seam below the bottom of the normal seam. Usually occurs at the side seam lap.

Dud - Container with no or low vacuum.

Dud Detector - Mechanism designed to identify low-vacuum containers and reject them.

Face - Outside of cap.

Factory End - Bottom or can manufacturer's end.

False Seam - A double seam where a portion of the cover hook and body hook are interlocked.

Filling Temperature - Temperature of product at the time a container is filled.

Finish - That part of the glass container that holds the cap or closure.

Finished Equilibrium pH - pH of the finished food.

Finish Ring - The mold which forms the finish or neck of the glass container.

First Operation (Double Seaming) - The operation in which the curl of the end is tucked under the flange of the can body to form the cover hook and body hook, respectively.

Flange - The outward flared edge of the can body that becomes the body hook in the double seaming operation.

Flat - A can with both ends concave; it remains in this condition even when the can is brought down sharply on its end on a solid, flat surface.

Flex Cracks - Small breaks in one or more layers of the package, due to flexing, but not a leaker. Also referred to as seal cracking.

Flexible Container - A container, the shape or contour of which, when filled and sealed, is significantly affected by the enclosed product.

Flipper - A can that normally appears flat; when brought down sharply on its end on a flat surface, one end flips out. When pressure is applied to this end, it flips in

again and the can appears flat.

Fractured Embossed Code - See **Cut Code**.

Gasket - Pliable material on the cap that contacts the glass sealing surface to form a hermetic seal.

Glass Thread or Lug - A horizontal, protruding ridge of glass around the periphery of the finish designed to engage the cap lug.

Gross Headspace - The vertical distance between the level of the product (generally the liquid surface) in an upright rigid container and the top edge of the container (i.e., the flange of an unsealed can, the top of the double seam on a sealed can, or the top edge of an unsealed jar).

Hard Swell - A can bulged at both end, and so tightly that no indentation can be made with thumb pressure.

Headspace – That portion of a container not occupied by the product. See **Gross Headspace** and **Net Headspace**.

Heel - Curved portion of glass container between the body side wall and the bottom.

Hermetic Seal - The condition which excludes the ingress of microorganisms, filth or other environmental contaminants that could render the product unfit for consumption or which could reduce the quality of the product to a level less than intended.

Hermetically Sealed Containers – Air-tight containers which are designed and intended to protect the contents against the entry of microorganisms during and after thermal processing. (§318.300 or §381.300)

Hook, Body - See **Body Hook**.

Hook, Cover - See **Cover Hook**.

Hot Bar - A sealing method that uses sealing bars which are maintained at a constant high temperature.

Impulse - A sealing method utilizing rounded sealing bars that are not hot enough to form a seal until after the two sealing surfaces have been pressed together.

Induction - A sealing method that employs the generation of a current in an electromagnetic field. The electrical resistance creates heat that fuses the lid to the container flange.

Jumped Seam - A double seam that is not rolled tight enough adjacent to the crossover.

Knocked Down Flange - A common term for a false seam where a portion of the body flange is bent back against the body without being engaged with the cover hook.

Lap - The section at the end of the soldered side seam consisting of two layers of metal bonded together. The lap eliminates some of the excess metal in the double seam at the side seam juncture.

Leakage - Loss of the hermetic seal.

Leakers - Containers which have leaked.

Lid - See **Cover**.

Lip - A projection where the cover hook metal protrudes below the double seam in one or more "V" shapes. Also known as a **Vee**.

Lot - Amount of a product produced during a period of time indicated by a specific code.

Lug Cap - Convenience closure for glass containers that requires no tool for removal.

Mechanical Vacuum Capper - Glass container closing machine that uses a vacuum pump to produce container vacuum.

Micrometer - A small precision instrument designed to measure double seams.

Mold Seam - A vertical mark on the body area of a glass container resulting from the matching of the two body mold parts.

Neck Ring - See **Finish Ring**.

Neck Ring Parting Line - A horizontal mark on the glass container surface at the bottom of the neck resulting from the matching of neck ring parts and body mold parts.

Net Headspace - The vertical distance between the level of the product (generally the liquid surface) in an upright rigid container and the inside surface of the lid. (§318.300 or §381.300)

Open Lap - A lap that is not properly soldered or has failed due to various strains in the solder.

Open Top Can - See **Can, Sanitary**.

Overlap - The distance the cover hook laps over the body hook.

Overpressure - Pressure supplied to a retort in excess of that exerted by steam or water at a given process temperature.

Packer's End - See **Cover**.

Panel - The flat center area in the top of the cap. May also apply to the area on the body of the container where the label is applied.

Paneling - Condition when the sides of the can are drawn in permanently.

pH - A measure of acidity or alkalinity. Chemically, pH is defined as the negative log of the hydrogen ion concentration.

Pinholing - Tiny holes in the metal food container usually caused by external rusting or internal attack by the product on the container.

Plastisols - Suspensions of finely divided resin in a plasticizer which are found in metal closures for glass containers and are an important component of vacuum sealing glass containers.

Plastisol-Lined Continuous Thread (PLCT) Cap - A closure style with flowed-in plastisol gasket and a continuous metal spiral which engages with a corresponding glass spiral ridge around finish of a glass container.

Pressure Ridge - The impression around the inside of the can body directly opposite the double seam.

Product Sealing Temperature - Recommended temperature for the product at time of sealing.

PT (Press-On Twist-Off) Cap - Deep skirt cap with molded plastisol gasket. Removal requires no special tool.

Pull-Up - Term applied to distance measured from the leading edge of closure lug to vertical neck ring seam.

Removal Torque - Force required to remove glass closure.

Retortable Pouch - Flexible, heat sealable, relatively flat container capable of withstanding the high temperatures required for pressure processing low-acid foods.

Reverse - Inside of glass closure.

Rigid Container - A container that is neither affected by the enclosed contents or deformed by external pressure up to 10 pounds per square inch gauge (i.e., normal firm finger pressure).

Rollstock - A long roll of packaging material from which some flexible and semirigid packages are machine-formed and sealed to contain food products.

Rotary Capper - A closing machine in which containers travel in a circular pattern through the capping functions.

Safety Button (Flip Panel) - Circular portion of cap panel that changes from convex to concave when container has vacuum.

Sealing Surface - The part of the finish that contacts the gasket. See **Top Seal** or **Side Seal**.

Seam Thickness - The maximum dimension of the double seam measured across or perpendicular to the layers of the seam.

Seamer - See **Closing Machine**.

Seam Width (Length or Height) - The maximum dimension of the double seam measured parallel to the folds of the seam.

Second Operation - The finishing operation in double seaming. The hooks formed in the first operation are rolled tightly against each other in the second operation.

Security - Residual clamping force or tension on lugs remaining in closure application when gasket is properly seated after processing and cooling.

Semirigid Container - A container, the shape or contour of which, when filled and sealed, is not significantly affected by the enclosed product under normal

atmospheric temperature and pressure, but which can be deformed by external mechanical pressure of less than 10 pounds per square inch gauge (i.e., normal firm finger pressure).

Sharp Seam - A sharp edge at the top of the inside portion of the double seam due to the end metal being forced over the seaming chuck.

Shoulder - Portion of glass container where maximum cross-section area decreases to join neck. Also portion of cap between panel and skirt.

Side Seal - Sealing surface on vertical portion of finish.

Side Seam - The seam joining the two edges of the body blank to form a can body.

Side Wall - Portion of glass container between shoulder and heel.

Skidder - A can having an incomplete double seam due to the can slipping on the base plate. In this defect, part of the seam will be incompletely rolled out. Term has same meaning as deadhead when referring to seamers that revolve the can. Also known as spinner.

Skirt - Vertical portion of closure.

Soft Swell - A can bulged at both ends, but not so tightly that the ends cannot be pushed in somewhat with thumb pressure.

Spinner - See **Deadhead** and **Skidder**.

Springer - A can with one end permanently bulged. When sufficient pressure is applied to this end, it will flip in, but the other end will flip out.

Steam Flow Capper - A straight or rotary style capper that produces vacuum in containers by sweeping air from headspace with steam.

Straight Line Capper - A closing machine in which containers travel in a straight line through the capping functions.

Stripped Cap - Lug closure applied with too much torque which causes cap lugs to pass over glass threads. May have vacuum but has no security value.

Surface Treatment - Lubrication applied to outside surface of glass containers to facilitate handling.

Thermoformed - Semirigid containers manufactured by pressing the rollstock into a die mold to form the container.

Tightness - The degree to which the double seam is compressed by the second operation rolls.

Top Seal - Horizontal sealing surface that is the top of the glass finish.

Transfer Bead - A continuous horizontal ridge of glass near the bottom of the finish that is used to transfer the container from one part of the manufacturing operation to another.

Twist Cap - See **Lug Cap**.

Ultrasonic Sealing - A sealing method that employs the generation of ultrasonic wave vibrations.

Uneven Hook - A body or cover hook that is not uniform in length.

Unseated - Breaking of the hermetic seal in a glass container.

Vacuum - A state of pressure reduction below atmospheric.

Vacuum Closure - Closures designed to maintain vacuum suitable for processing.

Vee - See LIP.

Vertical Neck Ring Seam - Vertical mark on glass neck surface caused by the joining of the two parts of the neck ring during formation of the jar.

Waffling - Embossing caused by racks during thermal processing that appears on the surface of the pouch.

Wrinkle - A fold of material in the seal area.

Wrinkle (Cover Hook) - A waviness occurring in the cover hook from which the degree of double seam tightness is determined.

Glossary of Terms Associated with Thermal Processing Systems

Acidified Foods – Low-acid food to which an acid or an acid food is added to produce a food with a final equilibrium pH of 4.6 or less and a water activity greater than 0.85. See next definition.

Acidified Low Acid Product – A canned product which has been formulated or treated so that every component of the finished product has a pH of 4.6 or lower within 24 hours after the completion of the thermal process unless data are available from the establishment's processing authority demonstrating that a longer time period is safe. (§318.300 or §381.300)

Agitating Cookers - Retorts or cookers that provide product agitation during processing.

Aseptic - See **Commercial Sterility**.

Aseptic Packaging System - A continuous system where packages are sterilized, then enter a pre-sterilized environment to be filled with sterile product and sealed.

Aseptic Processing - The filling of a commercially sterile, cooled product into pre-sterilized containers, followed by aseptic hermetic sealing with a pre-sterilized closure in an atmosphere free of microorganisms.

Aseptic Processing System - A system for continuously sterilizing a product.

Aseptic System - The entire system necessary to produce a commercially sterile product with a commercially sterile package; includes the aseptic processing system and aseptic packaging system.

a_w - A measure of the available water in a food.

Back Pressure Device - A valve or orifice which creates pressure when product is pumped against it.

Batch Retort – A retort system that is loaded with containers, sealed by closing a lid or door, then brought to retort temperature by introducing steam or other heating medium.

Batching – The preparation of a single “recipe” of a formula.

Blanching - Operation in which raw food material is immersed in hot water or exposed to live steam or hot gases.

Bleeders – Small openings in the retort which, when open during the process, remove air entering with the steam and circulate the steam.

Bourdon Tube - A closed, coiled, flexible, metal tube that is the heart of a temperature recording device. The coil expands or contracts as the temperature rises or falls and controls the position of the inking pen.

Canned Product – A meat food product with a water activity above 0.85 which receives a thermal process either before or after being packed in a hermetically sealed container. (§318.300 or §381.300)

Carriers - The part of the container-conveyor chain that holds a stick of containers in a fixed place during movement through the hydrostatic retort system.

Code Lot – All production of a particular product in a specific size container marked with a specific container code. (§318.300 or §381.300)

Colorimetric Method - Means of determining pH values with dyes.

Come-Up-Time - The time lapse (including venting time if applicable) between the introduction of steam into the closed retort and the time when the retort reaches the required processing temperature.

Commercial Sterility - Condition when equipment and containers are free of viable microorganisms of public health significance as well as those of non-health significance which are capable of reproducing under normal conditions of storage and distribution.

Consistency - Thickness or viscosity of a product.

Container-Conveyor Chain - Conveyor that moves the containers through the hydrostatic retort system.

Container Integrity - A reference to the visual condition of any container and its hermetic seal.

Cooker - Another name for a retort.

Critical Factor - Any property, characteristic, condition, aspect or other parameter that when varied may affect the scheduled process and the attainment of commercial sterility.

Deviation - A condition which occurs when one or more of the critical factors indicated in the scheduled process are not met.

Discharge Leg - Part of a hydrostatic retort through which the containers pass after leaving the pressure section.

Electrometric Method - The use of a pH meter to determine pH value.

Feed Leg - Part of a hydrostatic retort through which the containers pass before entering the pressure section.

Filling Temperature - Temperature of product at the time a container is filled.

Finished Equilibrium pH - pH of the finished food.

Flow Diversion Valve - A valve or valve cluster used to divert potentially non-sterile product away from the filler.

Free Rotation - The can rotation phase where the cans roll freely along the retort shell and product agitation occurs.

Gate Valve - A full flow type valve which has little or no restrictions which may impede movement through the valve.

Globe Valve - A better sealing valve than the gate valve; however, it restricts media flow through the valve.

Heating Medium - The means of transferring heat to the containers in the retort. Heating medium is typically steam, water or steam/air mixture.

Hold Tube - Section of an aseptic processing line in which commercial sterility of product is achieved based on time in the tube, temperature and flow rate of product.

Hot Bar - A sealing method that uses sealing bars which are maintained at a constant high temperature.

Hydrostatic Retort - A still retort in which pressure is maintained by water legs; it operates at a constant steam temperature while containers are continuously conveyed through it for the required process time.

Incubation - Maintenance of a food sample at a specific temperature for a specific time to encourage the growth of microorganisms that may be present in the sample.

Initial Temperature - The average temperature of the contents of the coldest container to be processed at the time the sterilization cycle begins.

Lot - Amount of a product produced during a period of time indicated by a specific code.

Low-Acid Foods - Any foods, other than alcoholic beverages, with a finished equilibrium pH greater than 4.6 and a water activity (a_w) greater than 0.85.

Mercury-In-Glass Thermometer (MIG) - Reference instrument which indicates retort temperature.

Metering Pump - A pump that delivers a precise flow rate of product through an aseptic processing system.

Micro-Cool Valve - A valve through which containers exit from the pressure shell in a continuous agitating retort. Water sprays are installed in this valve to cool the cans as they pass by.

Muffler - A device used on bleeders or vents to reduce noise.

NIST - National Institute of Standards and Technology

Operating Process - The process selected by the processor that equals or exceeds the minimum requirements set forth in the scheduled process.

Overpressure - Pressure supplied to a retort in excess of that exerted by steam or water at a given process temperature.

Paddle Packer - A device on the filler line located between the filler and the seamer/sealer that will “knock-out” excess product from a can. May be known as a **Headspace**.

pH - A measure of acidity or alkalinity. Chemically, pH is defined as the negative log of the hydrogen ion concentration.

Pocket Filler - See **Volumetric Filler**

Post-Process Handling - Conditions to which containers are subjected after being sterilized.

Process - Application of heat to foods either before or after sealing in containers for a period of time and at a temperature scientifically determined to be adequate to achieve commercial sterility.

Process Calculation - Scientific procedure to determine the adequate process time and temperatures for canned products.

Process Deviation - A change in any critical factor of the scheduled process that reduces the sterilizing value of the process, or which raises a question regarding the public health safety and/or commercial sterility of the product lot.

Process Schedule – The thermal process and any specified critical factors for a given canned product required to achieve shelf stability. (§318.300 or §381.300)

Process Temperature – The minimum temperature(s) of the heating medium to be maintained as specified in the process schedule. (§318.300 or §381.300)

Process Time – The intended time(s) a container is to be exposed to the heating medium while the heating medium is at or above the process temperature(s). (§318.300 or §381.300)

Processing Authority – The person(s) or organizations(s) having expert knowledge of thermal processing requirements for foods in hermetically sealed containers, having access to facilities for making such determinations. (§318.300 or §381.300)

Processing Medium - See **Heating Medium**.

Product Regenerator - A type of heat exchanger that utilizes the heat of uncooled sterile product to heat non-sterile product.

Product Sealing Temperature - Recommended temperature for the product at time of sealing.

Pure Steam - Saturated steam that is free of air.

Recording Tachometer - Instrument that measures and records the revolutions per minute in an agitating cooker.

Retort - Any closed vessel or other equipment used for thermal processing. May also refer to the act of applying a thermal process to a canned food in a closed pressurized vessel.

Saturated Steam - Pure steam, i.e., free of air.

Scheduled Process - The process selected by the processor as adequate under the conditions of manufacture for a given product to achieve commercial sterility.

Shelf Stability – The condition achieved by application of heat, sufficient, alone or in combination with the ingredients and/or treatments, to render the product free of microorganisms capable of growing in the product at nonrefrigerated conditions (over 50°F or 10°C) at which the product is intended to be held during distribution and storage. Synonymous with COMMERCIAL STERILITY. (§318.300 or §381.300)

Sight Glass - A clear glass tube with both top and bottom connected to openings in the retort shell; used to visually determine water level in the retort.

Steam Dome - That section of a hydrostatic retort in which sterilization takes place.

Steam Header - The pipe that delivers steam to a number of retorts.

Steam Inlet - The opening through which steam is admitted to the retort.

Steam Spreader - Continuation of the steam line inside the retort with perforations through which steam is discharged into the load of containers.

Steam-Water Interface - That point in the steam dome where the steam used for processing and the water used for hydrostatic pressure contact one another.

Sterilization - As used in this text, the act of achieving commercial sterility. See **Commercial Sterility**.

Stick - In hydrostatic retorts, the row of containers on their sides which is equal to the length of a carrier on the chain conveyor.

Still Retort - A discontinuous (batch-type), non-agitating, vertical or horizontal, enclosed vessel used in the processing of canned foods.

Strip Chart - Continuous recording equipment that automatically monitors temperatures in thermal processing systems.

Superheated Steam - Steam at 212°F (100°C) or greater, but at atmospheric pressure.

Surge Tank - A sterilizable storage device, linked to the processing line, that holds sterile product.

Tachometer - See **Recording Tachometer**.

TDT (Thermal Death Time) - Time required to destroy a specific microorganism at a given temperature.

Temperature Indicating Device - A thermometer or other temperature-sensing device that serves as an indicator of the official process temperature.

Temperature/Time Recording Device - An automatic instrument that records time and temperature during the thermal process.

Thermal Death Time - See **TDT**.

Thermal Resistance - The amount of heat required to kill bacteria.

Thermal Process – The heat treatment necessary to achieve shelf stability as determined by the establishment's processing authority. It is quantified in terms of time(s) and temperature(s) or minimum product temperature. (§318.300 or §381.300)

Thermocouple - A device that measures temperature electrically.

Transfer Valve - A valve through which containers pass when moving from one pressure shell to another in a continuous agitating retort.

Vacuum - A state of pressure reduction below atmospheric.

Vacuum-Packed Foods - Foods that are sealed in a container under the vacuum specified in the scheduled process; the maintenance of this vacuum is critical to the adequacy of the scheduled process.

Vent - Opening through the retort shell controlled by gate, plug cock or other adequate valve used for the elimination of air during the venting period.

Venting – The removal of air from a retort before the start of process timing.

Volumetric Filler - A filler machine that fills by a volume of product rather than by weight or level. May be referred to as a **Pocket Filler**.

Water Activity (a_w) - A measure of the free moisture in a product. It is determined by dividing the water vapor pressure of the substance by the vapor pressure of pure water at the same temperature.

Water Level Control - An automatic device that controls water level in retorts.

Glossary of Terms Associated with Dried Meat and Poultry Products Processing

Antioxidants – Ingredients added to cooked sausages to retard oxidative rancidity and protect flavor. Include butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA) and others.

a_w - A measure of the available water in a food.

Batch – All the ingredients in a formulation.

Binding – The ability of sausage components to emulsify fats and hold water.

Bound Water – Water in a product that is structurally associated with the meat proteins, membranes and connective tissues. Will not be removed during the drying process.

Brine – Water saturated or nearly saturated with salt.

Case Hardening – An undesirable crust that sometimes forms on the casing of dry sausage items; it prevents adequate drying of the affected product.

Chemical Acidulants – A chemical used to lower the pH of meat and poultry products. Used instead of a fermentation process.

Cold Smoke – Smoke applied to product where the smokehouse temperature is low, generally 90° to 120°F.

Cold Spots – The area or areas within a smokehouse that are not exposed to as much heat as the rest of the smokehouse.

Dry Bulb Temperature - Measure of air temperature by a thermometer whose bulb is not wet.

Dry Room – A room in which the atmospheric relative humidity is maintained at a very low level in order to facilitate drying of certain sausage products. The temperature of such rooms is also usually closely controlled.

Encapsulated Acidulant – A chemical acidulant that is coated (encapsulated) with fat to allow for a controlled drop in pH of the product.

Free (Or Bulk) Water – Water in meat that is held only by weak forces. Free water is available to microorganisms for growth.

Glucono-Delta-Lactone (GDL) – A slow release chemical acidulant.

Green Room – A room in which freshly prepared sausages are held, to promote the growth of lactic acid-forming bacteria before they are moved to a drying room.

Hurdle Effect – Combination of inhibitors that are more restrictive than the individual inhibitors alone.

Hydroflake – A method of thinly slicing or flaking frozen boneless meat prior to grinding.

LAB (Lactic Acid Bacteria) – Bacteria that form lactic acid as they grow. Includes Lactobacilli and others such as Pedococci.

Lactobacillus – A genus of bacteria that form lactic acid as they grow. Cultures of these bacteria are added to certain meat and poultry foods to produce a characteristic flavor and odor.

Meat Block – The amount of meat and or meat byproducts used to make a specific sausage batch.

Meat Matrix – A mixture of lean and fat meat particles bound together by salt soluble meat proteins.

Mixed Cure – One that contains both nitrate and nitrite.

Moisture Protein Ratio (MPR) – One method used to describe the moisture level in a product.

Myosin – A major protein in muscle tissue.

Natural Fermentation – Fermentation process that is not aided with the use of a starter culture, but instead relies on naturally occurring bacteria or inoculation with other fermented product (known as “mother batch” or “backslop”).

Relative Humidity – The amount of water vapor in the air expressed as a percentage of the maximum amount of water the air could hold at a given temperature.

Restricted or Immobilized Water – This water will form loose associations “binding” with protein.

Sausage Mix – Raw coarsely comminuted sausage showing discrete particles of lean and fat.

Silent Cutter – The commercial name for a machine that mixes and grinds sausage ingredients. Ingredients are placed into a revolving tub that carries the ingredients into rapidly rotating knife blades that chop and emulsify the material. Sometimes called a **Sausage Cutter** or a **Chopper**.

Starter Culture – A blend of bacteria added to a product to result in a controlled fermentation process or other desirable outcome.

Trichinae Treatment – All sausage and meat food products containing pork that are neither cooked or understood by the public as needing to be cooked prior to serving must be treated by one of the prescribed methods in 9 CFR §318.10.

Vacuum Mixer – A mechanical device used to mix sausage emulsions under vacuum in order to reduce the occurrence of air pockets in the finished product.

Water Activity (a_w) - A measure of the free moisture in a product. It is determined by dividing the water vapor pressure of the substance by the vapor pressure of pure water at the same temperature.

Water Holding Capacity – Ability of proteins to bind water.

Wet Bulb Temperature – Measure of air temperature by a thermometer whose bulb is covered by a cloth sleeve which is kept moist. Reflects the evaporation of moisture from the surface of the thermometer bulb.