

CHAPTER 6, SUBJECT 2
OPERATIONS - CANNERIES

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CANNING OPERATIONS

1.1 APPLICATIONS GENERAL

FIR, PART I, GENERAL, SECTION 7

Unless otherwise permitted by the Minister, fish shall be packed in new, clean, sound containers.

FIR, SCHEDULE II, PART I, SECTION 12

Unnecessary material or equipment shall not be stored in a working area of an establishment.

FIR, PART I, GENERAL, SECTION 24

No person shall export or import or attempt to export or import cans of fish:

- a) that have not been properly sealed;
- b) the tops or bottoms of which have been distorted outwards; or
- c) that are otherwise defective.

FIR, SCHEDULE II, SECTION 27, CANNERIES

Canneries and all equipment and utensils used in the operations of a cannery shall be kept in good repair and in a clean and sanitary condition.

FIR, PART III, CODE MARKINGS, SECTION 32(1)

Every can of fish that is packed in an establishment for which a registration certificate has been issued shall be embossed with code markings that:

- a) identify the establishment;
- b) indicate the day, month and year of processing; and
- c) identify the product contained therein in accordance with the table to this subsection.

CANNING OPERATIONS

1.1 APPLICATIONS GENERAL (cont'd)

Table

Product	First letters of code marking
1. Salmon Blueback.....	B
Chum.....	K
Coho.....	C
Pink.....	P
Sockeye.....	S
Spring.....	T
Steelhead.....	H
Mixed species of minced salmon..	M
2. Lobster.....	L
3. Tomalley or lobster paste.....	LT
4. Lobster cocktail.....	LC

(2) A copy of the key to every code marking required by this section shall be sent to the Minister each year before the commencement of processing operations.

FIR, PART III, CODE MARKINGS, SECTION 33

Notwithstanding subsection 32(1), any hermetically sealed glass container containing fish is exempt from the embossing requirement referred to in that subsection, if such container or the label affixed thereto is otherwise permanently marked with the code marking required by that subsection.

FIR, PART IV, CANNED FISH, SECTION 34

Canned fish shall be sterilized by a method approved by the Minister.

FIR, PART IV, CANNED FISH, SECTION 35

All canned fish, except canned fish packed in flat drawn cans, shall have sufficient vacuum to ensure that can ends do not bulge when the product is heated to a temperature of 35 degrees celsius.

CANNING OPERATIONS

1.2 AREA SANITATION

Reason

Unless there is a complete washdown and sanitizing of the processing surfaces, bacteria will grow on the working surfaces. Tables shall be washed and sanitized at the end of each work shift. The containers used to transport finished material to the filling machine should be washed after each use.

Unsanitary filling machines will result in contamination of the product. The filling area and the area around the canning line must be kept in a sanitary condition at all times as part of general housekeeping.

Compliance

The filling area and filling machines are kept clean and sanitary at all times.

All processing surfaces and equipment are cleaned, washed and sanitized at the end of each work shift.

The cleaning and sanitizing program is monitored by the plant. Appropriate records are maintained.

Verification

Inspect all aspects of the housekeeping as well as cleaning and sanitizing programs followed for the filling area and services to ensure they are adequate.

CANNING OPERATIONS

1.3 CONTAINERS PROPERLY HANDLED

Reason

Filled containers are susceptible to damage from impact or abrasion which could affect the integrity of the container.

When conveyors, chutes and systems for loading retorts or crateless retorts are poorly designed, maintained or operated, they may cause damage to the containers.

Impact abuse occurs when containers abruptly change speed or direction, resulting in dents to double seams and/or container bodies.

Sealed containers with adhering organic matter should be washed to remove extraneous material prior to retorting to remove organic matter from the containers. Extraneous material should not be allowed to remain on the container, as these residues will induce corrosion and rust formation. Even after thorough drying, such residues have a tendency to absorb moisture from the air and thereby promote rusting of the container.

All sealed containers should be rinsed in cold water to remove the majority of the residue and then washed with hot water and detergent before sterilization. Hot water must not be used prior to rinsing in cold water as it will coagulate soluble proteins making them difficult to remove. Detergents, approved for use in food-processing establishments, must be used for container washing because of the possibility of leakage into a container. The detergent and brushes used must not react with or affect the container enamel or plate.

Compliance

Where necessary to remove adhered organic matter, water and detergent in appropriate quantities and at an adequate temperature are used to clean the outside of the containers after closing but before retort processing.

Conveyors are designed, operated and maintained so as to minimize the damage at impact points. Attention is paid to conveyor speeds and transfer points to ensure that no damage occurs to containers from impact, and that containers do not fall off the conveying system.

CANNING OPERATIONS

1.3 CONTAINERS PROPERLY HANDLED (cont'd)

Verification

Check container-handling systems for situations which could result in container damage.

Inspect transfer points on filled container conveyor systems for evidence of rough container handling.

Determine if there is rough handling of the filled sealed containers en route to the retort. The dropping of filled sealed containers into baskets, without some cushioning, is not acceptable. Cushion water of acceptable quality must be used.

Observe that containers are not being abused through rough handling by personnel. Observe if the company practice in filling retort baskets ensures that subsequent abrasion damage will not occur.

Confirm that containers are adequately cleaned.

CANNING OPERATIONS

1.4 CONTAINERS PROPERLY SEALED

Reason

Proper sealing of a container depends on the precise formation of a double seam. A double seam is an hermetic seal formed by mechanically interlocking and ironing together the curl of the container end and the flange on the container body. It keeps bacteria from entering the container and it prevents the contents from seeping out of the container. To be mechanically sound a complete inter-locking of the end hook and the body hook must occur around the complete perimeter of the container. To be mechanically sound the seam must have adequate tightness and any voids that exist in the mechanical seal must be filled with some form of gasket material.

Damaged containers entering the sealing machine may result in improperly formed seals which compromise the safety of the final product. Likewise, a high proportion of defective containers will result from product being deposited on the flange such that it interferes with the double-seam formation.

For retort pouches, the hermetic seal is formed by applying heat and pressure to fuse the two sides of the pouch together. Inadequate seals will result from product or moisture on the sealing area or from the incorrect application of heat or pressure to the pouch sealing bar.

Compliance

Adjustments and maintenance of the seaming equipment are routinely performed to give correct seam contours and to prevent seam problems. Variations in container materials, plate thickness and temper are checked and taken into account when setting up the seamer.

All container body flanges are free from defects as described in the Government of Canada Metal Can Defects Manual.

Container ends have the proper type, amount and placement of sealing compound on the end curl. The end curl is free from defects as described in the Government of Canada Metal Can Defects Manual.

CANNING OPERATIONS

1.4 CONTAINERS PROPERLY SEALED (cont'd)

The solder placement on the side-seam of three-piece container bodies is not thick at the lap, so as to create problems at that point when the double seam is formed.

For retort pouches, adjustment and maintenance of the sealer equipment are routinely performed to ensure that an adequate seal is obtained. Variations in retort pouch materials are checked and taken into account when setting up the pouch sealing bar.

All bones/skin or product lying on or adhering to the flange must be removed. This involves continuous monitoring since debris left on the flange could cause formation of an improper double seam upon seaming the container.

To ensure a proper seal on the retort pouches, all product and moisture must be removed from the sealing area and continuous monitoring for clean sealing area is essential.

As each tube of ends is put into the clincher or seamer, the ends are inspected by rotating the tube and inspecting for evidence of damage. All ends showing evidence of damage are removed and discarded.

Visual can seam inspections are made during production runs at periods not to exceed 30 minutes. For retort pouches all containers are inspected after sealing. Results of inspections, including defects observed and corrective actions taken are recorded and kept on file.

Qualified personnel complete a top double-seam teardown inspection of one container from every container seaming head operating in the plant. This procedure is carried out at least once every 4 hours of seamer operation, after a jam-up, or after a lengthy shut down and the results are recorded in a logbook.

For retort pouches, qualified personnel complete a burst test of one pouch for each position on the sealing bar(s) at the beginning of production, approximately every hour of production, and after interruptions in production. The results of these tests are recorded.

CANNING OPERATIONS

1.4 CONTAINERS PROPERLY SEALED (cont'd)

Plant personnel inspect container integrity and container code legibility and accuracy by following an inspection schedule, which contains details on the type of test, frequency and sample sizes.

Verification

Examine the seaming operations. Observe that routine visual examinations are being performed at least once every 30 minutes and the results are recorded.

Determine the manufacturer and model number of the seaming unit and its recommended maximum speed in containers per minute. Compare this speed with that used in actual operation, as speeds above the maximum recommended may cause sealing defects.

Determine that the processor maintains manufacturer's instructions on the operation, maintenance, and adjustment of the seamer.

Observe if container seaming, or retort pouch sealing operations are stopped when container integrity defects are found, or if seam measurements deviate from the container manufacturer's guidelines.

Check for potential sources of seam interference such as:

- a) the presence of product bones, skin or fins adhering to the container flange;
- b) the presence of ingredients adhering to the container flange; and/or
- c) the presence of product or moisture on the sealing area of retort pouches.

Determine that teardown examinations for container double seams are performed and records are maintained.

For closures other than double seams, determine that appropriate tests are being performed and records maintained. For glass containers, determine that the appropriate tests are being performed and records maintained.

CANNING OPERATIONS

1.5 CONTAINER VACUUM (for those containers requiring a vacuum)

Reason

When overfilled containers are sealed they may have low vacuum, which causes the ends to be distended if the temperature is increased or the altitude is increased above sea level. When there is not enough vacuum to hold the ends in place, a sharp blow may cause either or both ends to bulge. Overfilling may also result in the product being trapped on the flange and in the seam which causes serious seam defects and compromises the safety of the final product. In addition the excessive fill will create an increased internal pressure on the container during heat processing, thereby creating undue strain on the closure.

An adequate vacuum holds the ends of the container in an acceptable concave position. Any position other than concave is an indication of possible spoilage.

An excessive amount of vacuum may cause panelling. This is more pronounced with double cold-rolled (2CR) tinfoil at the start of the sterilization cycle. Insufficient vacuum may cause bulging of the container if the outside pressure is low, as might happen if the container were stored at high elevation.

In large flat containers, the vacuum holds the sides of the container in direct contact with the product which improves the rate of heat transfer and stabilizes the product shape.

It is essential to control both the headspace and the filling temperature to ensure sufficient vacuum in the container.

An increase in gross headspace results in a decreased vacuum for a hot-filled product and an increased vacuum for containers closed using steam injection.

Also, as the filling temperature (closing temperature) is increased, the resultant container vacuum for either of the above methods is increased assuming that the headspace is held constant.

In retort pouches, a vacuum is drawn to minimize the residual air in the retort pouch which could cause "ballooning" during the heating process with possible resultant underprocessing or seal damage.

CANNING OPERATIONS

1.5 CONTAINER VACUUM (cont'd) (for those containers requiring a vacuum)

Compliance

Vacuum-closing machine operations and steam or heat-exhaust operations are monitored by plant personnel in order to ensure proper vacuum drawing procedures provide sufficient vacuum to maintain container ends concave at 35 °C (95°F).

The usual procedures for the removal of air from the containers are as follows:

Preheat and/or Thermal Exhaust Closures:

The container contents are heated just prior to filling, after filling, or a combination of both. The heat causes the product to expand, reducing entrapped, occluded, and dissolved air and gases. It also increases the vapour pressure in the headspace dispelling the air before closure. As the contents of the container cool and contract after heat processing, a vacuum forms.

Mechanical Vacuum Closure:

Warm product is placed into the containers. The container passes into a clincher, which loosely attaches the end, but does not form the double seam or make the container air tight. From the clincher it goes into a vacuum chamber in the closing machine, which draws a vacuum and completes the formation of the double seam. The container is then air tight.

Steam-Vac Closures (Steam flow, Vapour Vac):

At the time of closure, steam is injected into the headspace, dispelling the air. After closure, the steam condenses and creates a vacuum.

Retort Pouch Sealing Machine:

Retort pouches are placed in a vacuum chamber with the neck of the pouches across the sealing bar. A vacuum is drawn on the chamber for a preset time in order to remove the air from the retort pouch; heat and pressure are then applied to complete the seal.

CANNING OPERATIONS

1.5 CONTAINER VACUUM (cont'd) (for those containers requiring a vacuum)

Verification

Determine that adequate vacuums are attained and observe if checks for proper container fills are performed.

Determine the headspace (gross or net) specification for each product. Headspace is vital for vacuum control and proper processing and generally should be controlled at 8 mm (approximately 10/32 inch) to 12 mm (15/32 inch). As container vacuum absorbs trapped gasses, the initial vacuum should be higher than the desired finished vacuum.

Determine how often vacuum is checked.

For retort pouches, residual air determinations must be made for each production run to ensure that the maximum value specified in the filed process (typically 10 cm³) is not being exceeded.

It is usual to have a higher vacuum and more headspace in jars than in containers. In most cases, headspace volume should be not less than 6% of the container volume at the sealing temperature. Once the relationship of headspace volume for a specific product is established for a given container, the headspace may be measured with a depth or headspace gauge rather than by volume.

In steam-vac closures, check on the possibility of contamination from the steam condensate, which accumulates in the steam line during shutdown. Determine what boiler water additives are used by the company and if they are acceptable.

Check for carry-over of boiler additives in the steam used to exhaust air from the containers. Boiler additives carry-over will usually be noted after retort operations. A steam-pressure cook with boiler-water additives carry-over will leave a powdery film on the containers; a water-bath cook heated with live steam will show detinning of the containers.

CANNING OPERATIONS

1.6 CODING

Reason

The code which is embossed or marked on the container ends or on the retort pouch during closure is important as a means of keeping track of production and inventory, particularly in the event of a product recall. The code embossed on the container shall identify the establishment, year and date of pack as well as species, as required.

It is also common practice to code the batch and shift period or sub-period. Should problems arise with a product, codes will be essential for identifying the source and date of production. In addition, a written procedure to facilitate the complete and rapid recall from the market of any lot of finished food products should be established by and tested by the processor.

Codes which are embossed with too great an imprint force may result in enamel damage, rust or perforation. Irregularities in the embossing may also cause variations in end deflections and produce problems where can-screening operations are employed.

Compliance

Routine visual examinations are made to check the legibility of codes as well as the imprint.

Submissions of the explanations of codes are sent annually or more often as necessary, prior to the commencement of operations, to the Canadian Food Inspection Agency (CFIA) Regional Inspection designate of the region in which the cannery is located.

All containers are legibly embossed or otherwise permanently marked, at the time of container closing, with a code indicating the product (where specified in the FIR), the identity of the establishment, the day, month, year of processing and if possible, batch number and code, retort number, and code shift period and sub-shift period.

All hermetically sealed glass containers containing fish are exempt from the embossing requirements if such container or the label affixed thereto is otherwise permanently marked with the required code markings.

CANNING OPERATIONS**1.6 CODING (cont'd)****Verification**

Confirm that containers are being coded in accordance with the submissions of explanations of codes, which were provided to the CFIA prior to the plant commencing production.

Determine that each container carries an identifying code, either permanently inked or embossed on the container. The code must identify the product (where specified in the FIR), the establishment, and the processing day, month and year.

Verify that the containers are coded at the time of sealing.

Check containers to see that the code is legible and accurate.

Check that all hermetically sealed glass containers containing fish have been permanently marked with the code on the container or the label affixed thereto.

CANNING OPERATIONS

1.7 EQUIPMENT CLEANING

Reason

Unless there is a complete washdown and sanitizing of all processing surfaces, tables and containers used during processing, there will be an accumulation of fish or other ingredient residues and an increase in bacterial growth, thereby contaminating any product coming into contact with these surfaces.

If containers are left on the packing tables or in conveyor systems during clean-up, they are likely to become splattered with dirty water or debris, particularly if high-pressure hoses are used in cleaning.

Compliance

All processing surfaces and equipment are washed at each break during production to remove all accumulated protein material.

By anticipating the shutdown of the canning line at breaks and end of shift, the flow of containers to the filling machine or packing table is controlled so that none are left in the conveyor lines or the packing racks when the operation stops. Those containers left are either removed or so shielded that they will not become contaminated or obstruct the cleaning.

All processing surfaces and equipment are washed, cleaned and sanitized at the end of each work shift.

The filling machines are dismantled, cleaned and sanitized at the end of each shift and when unsanitary conditions occur.

The cleaning and sanitizing program is monitored by the plant personnel, and accurate records of the activities performed are maintained.

Verification

Verify that the requirements of this sub-item are met.

Observe the cleaning and sanitizing program at start-up and shut-down of production.

CANNING OPERATIONS

1.8 EQUIPMENT OPERATION

Reason

The operational adequacy of the filling machine(s) must be checked before the canning operation begins.

Filling machines may be a source of spoilage bacteria because the temperature of the filling area may be within the thermophilic growth range. This might occur during operation from contact with a heated product, or during shutdown periods from leakage of steam-supply valves. Fillers should be dismantled and cleaned as frequently as practicable to prevent growth of spoilage bacteria.

The filling machine is susceptible to container jam-ups which damage containers and create hazardous conditions.

The containers and product can be contaminated from various sources during their travel through the filling line.

Underfilled containers may cause the product to receive an excessive heat process thus causing a loss of product quality. Such containers also normally present a violation of the weight declarations.

An increase in the amount of oxygen in the headspace accelerates the corrosion of the container. This is a chemical reaction in which the acidity of the product combining with the available oxygen in the headspace can cause detinning or even pinholing of the container itself. If the headspace is not completely evacuated, oxidation of the product at the headspace surface can cause the product to turn brown.

Compliance

The filling machines are checked for accuracy at the beginning of each work shift and after each dismantling.

All damaged containers or retort pouches are carefully controlled and periodically removed from the process area for disposal or returned to the manufacturer. Reconditioning of damaged containers or ends is not permitted.

CANNING OPERATIONS

1.8 EQUIPMENT OPERATION (cont'd)

Precautions are taken to prevent contamination of the containers and product during the filling and cleaning operations.

Filled containers going to the closing machine must be continually monitored for adequacy of fill which includes shortweights, with insufficient product and/or packing media, as well as overfills with excessive product and/or packing media.

Automatic check-weighing machines must be kept clean and adjusted, if necessary, for accuracy at the beginning of each shift. This procedure is also conducted after any extended break in production.

If manual check-weighing is utilized the scales should be kept clean and calibrated at the beginning of each shift and also after any extended break in production. In addition, continual visual monitoring is required to spot obvious excessively overfilled containers which would create seaming problems.

The air is evacuated from the headspace before the containers are sealed.

Verification

Observe the container-filling operation and determine that the following are done satisfactorily:

- controlling container fill and headspace within specifications by evacuating trapped air from filled containers;
- dismantling, cleaning and sanitizing the equipment on the filling line;
- taking corrective action after a container jam-up; this includes inspecting the cans involved for missing metal, checking the filler for metal fragments, determining the cause of the jam-up, taking steps to prevent a recurrence, and documentation;
- avoiding splashes from being reintroduced into the following containers;
- shielding filled containers from contamination during transfer to seamer; and
- culling out underfilled and overfilled containers

The conditions under the compliance are the minimum requirements to satisfy the Regulations.

CANNING OPERATIONS

1.9 PACKING WORKMANSHIP

Reason

Container filling is the last point where visual inspection can take place and where defective material can be removed from the product. At the packing table, the condition of the container flanges must be continually monitored. Containers with damaged flanges or product over the flange must be removed as they frequently cause improper seam formation. This inspection area must have sufficient lighting and enough space for people to adequately carry out this function.

It is essential that container-filling operations, mechanical or manual, ensure that the filling requirements specified in the scheduled process for the particular type of pack being produced are met. Improper container filling, overfilling or underfilling can adversely affect the safety and shelf life of a product.

Improper filling or overfilling can result in product being deposited on the flange where it interferes with the double-seam formation during the seaming operation and leads to containers being produced with seam defects or with inadequate vacuum due to insufficient head space.

All ingredients such as salt, oil, broth, and sauces being added to the container must not be contaminated with dust, dirt, insects, or other foreign material prior to or during their storage or during production. All ingredients must be food grade quality to ensure an acceptable quality finished product.

Improper filling may produce containers with low vacuum, which causes the ends to be distended if the temperature is increased above normal or if the pressure is reduced. When there is not enough vacuum to hold the ends in place, a sharp blow may cause either or both ends to bulge. Bulging ends may indicate a container which has low vacuum or is non-sterile.

For retort pouches the thickness of the filled container must not exceed the maximum thickness specified in the filed process, otherwise underprocessing could result.

Patching underweight containers can lead to excessively overweight containers unless all patched containers are re-weighed prior to being returned to the line.

CANNING OPERATIONS

1.9 PACKING WORKMANSHIP (cont'd)

The scale used in measuring container weights at the patching table must be routinely cleaned since any product or skin adhering to the scale will affect its accuracy. The "patching tableweight", the weight of a filled container without lid, must be routinely checked.

Compliance

Prior to container filling, employees visually inspect on a continual basis all cleaned material for the presence of offal, foreign matter and off-coloured flesh. All defective material found is removed from the processing line and re-worked or rejected as required.

For retort pouches, all product to be filled is examined to ensure that there are no projecting bones or other sharp objects that could pierce the pouch when the vacuum is drawn. All defective material is reworked or rejected as required.

Loins or steaks are cut neatly and uniformly to ensure proper piece size for the intended style of pack. The sharpness of filling-machine knives are checked at least every 2 hours, to ensure that loose product is not being deposited on the container flange. The filling-machine knives are checked at least once per hour for the presence of nicks.

Container flanges are inspected continuously to ensure that no product is adhering to the flange which could interfere with the proper formation of the double seam.

Retort-pouch sealing areas are inspected continuously to ensure that there is no adhering product or moisture which could cause an improper seal.

All ingredients are food grade, are clean and not contaminated with any foreign substance.

All containers with defective flanges are removed from the processing line.

Plant staff monitor the container-filling operations at the container-filling inspection station, on each line, by using suitable weighing devices, to ensure that fish fill and net content specifications are met.

CANNING OPERATIONS

1.9 PACKING WORKMANSHIP (cont'd)

Retort-pouch filling operations are monitored, using suitable gauges or measuring equipment to ensure that the maximum thickness requirement is not being exceeded.

Containers which do not meet weight specifications are removed from the processing line and are rejected or corrected as required.

Accurate records of weight (thickness measurements for retort pouches) and quality-control inspections are maintained for a period of not less than 36 months.

Verification

Observe if all defective material and containers are removed prior to the completion of filling.

Observe that all product to be packed in retort pouches is inspected for sharp projections that may pierce the pouch material, and that unacceptable material is reworked or removed.

Check that there is continuous monitoring for product over the flange and that all unacceptable containers are removed and the flange interference problem corrected before it is placed back on the production line.

Check that there is continuous monitoring of pouches for product or moisture on the sealing area and that all unacceptable pouches are corrected before further processing.

Determine that critical factors, as indicated in the scheduled process, are checked and recorded at an adequate frequency to demonstrate the safety of the thermal process. Examples of product critical factors include ratio of solids to liquid, percent solids, headspace, consistency, fill temperature or style of pack.

Check that the patching of underweight containers is done correctly and does not create problems such as overfills.

Observe that the retort pouch thickness is monitored to ensure that the maximum specified thickness is not exceeded.

CANNING OPERATIONS

1.9 PACKING WORKMANSHIP (cont'd)

Determine that the company procedures are followed, to ensure that underweight and overweight containers are patched to an acceptable weight.

Be on the alert for signs of overfill, such as excess spillage of product on or about the filler, or product streaked on the outer surface of the container.

For glass containers, determine the quality-control procedures established in the case of glass breakage and any records maintained. See if there is a gap detector in the closing machine which could indicate breakage on the line.

Measure the amount of light on the packing table using a standard light meter to confirm acceptable levels of illumination.

EMPTY CONTAINER HANDLING

2.1 APPLICATIONS GENERAL

FIR, PART I, GENERAL

Unless otherwise permitted by the Minister, fish shall be placed in new, clean, sound containers.

EMPTY CONTAINER HANDLING

2.2 CONTAINER INSPECTION, HANDLING AND CLEANING

Reason

As there is always a possibility that containers may be soiled or contain foreign matter, they must be satisfactorily cleaned.

Product containers which are not clean and sanitary are a source of contamination to the final product. Defective or damaged containers or ends will frequently result in defective seals on the final product and thereby compromise the safety of the product.

Compliance

Empty containers or retort pouches are inspected to ensure that no defective or soiled containers are being fed into the production line. All defective containers which are removed from the line are placed under the control of the plant quality-control section and destroyed or returned to the container manufacturer.

Containers and retort pouches are conveyed in such a manner as to prevent damage and maintain container integrity.

All manual handling of empty containers and ends is done with adequate care to ensure that they are not damaged.

All empty containers are inverted (where appropriate) and air or steam cleaned and/or washed with approved water prior to filling. Both air-pressure nozzles and vacuum systems are considered acceptable as a cleaning system for empty containers.

There are three steps in the inverted, hot-water rinse container cleaning operation:

1. The containers travel a short distance in an inverted position to allow dust particles and pieces of solder to fall out.
2. The containers are flushed and rinsed with hot water (about 82°C or 180°F).
3. They travel a short distance in an inverted position for the purpose of draining off excess water.

EMPTY CONTAINER HANDLING**2.2 CONTAINER INSPECTION, HANDLING AND CLEANING (cont'd)**

A cold-water wash, steam or air blast may be used but these are considered less effective than the above method of cleaning.

By anticipating the shutdown of the canning line, at breaks and end of shift, the flow of containers to the filling machine or packing table is controlled so that none are left in the conveyor lines or the packing racks when the operation stops. Those containers left are either removed or so shielded that they will not become contaminated or obstruct the cleaning.

Verification

Determine whether containers are handled or conveyed so as to prevent any damage before use.

Determine that all empty containers are inverted (where appropriate) and air-, vacuum- or steam-cleaned and/or washed with approved water prior to filling to ensure that they are clean. Both air-pressure nozzles and vacuum systems are considered acceptable.

Check whether container conveyors are shielded to prevent contamination of the containers during cleaning, especially for glass containers, and whether, at the end of a day's operation, container conveyors are emptied of unused containers to avoid contaminating them during clean-up operations.

Determine that containers are not used for any purpose other than packing food, such as for ash trays, waste containers, or receptacles for small machine parts.

EMPTY CONTAINER HANDLING

2.3 RECEIPT OF EMPTY CONTAINERS AND ENDS

Reason

All lots of containers and ends brought into the cannery shall be inspected according to predetermined standards and procedures. Containers shall be inspected for:

- a) proper type of inside enamel and outside coating;
- b) defects and integrity of the side seam, if present;
- c) bottom double seams;
- d) can body manufacturing defects;
- e) shipping damage; and
- f) general cleanliness.

Retort pouches shall be inspected for manufacturing defects, shipping damage, and general cleanliness when they are brought into the cannery.

Storage areas for empty containers and ends must be dry and protected from all hazards such as dust, debris, the weather and pests.

Compliance

For rigid containers:

- the container makers provide guidelines for double seams, enamel, and tin coating;
- handling practices which could result in damaged seams and flanges are to be avoided;
- the tin coating and enamel is appropriate for the product being canned.

Ends for containers which are to be opened with keys or by pull tabs, are examined carefully to ensure that the scoring is even and deep enough for the container to be opened easily, but not so deep that the end will tear during sealing, heat processing or under the mechanical strains the container would normally encounter during distribution.

Regular samples of incoming container bodies and container ends are inspected for compliance with the container manufacturer's guidelines, and for container manufacturing defects as described in the Government of Canada Metal Can Defects Manual.

Retort pouches are examined on receipt for defects such as:

EMPTY CONTAINER HANDLING

2.3 RECEIPT OF EMPTY CONTAINERS AND ENDS (cont'd)

- a) general cleanliness;
- b) outside dimensions as specified;
- c) defects such as delamination, improper side or bottom seams or improper tear notches; and
- d) solvent or other off-odours from the interior of the pouch.

Glass containers are examined on receipt for defects such as:

- a) tramp glass (loose glass in the jars or carton); and
- b) hairline fractures.

Caps for jars are examined on receipt for:

- a) enamel faults, absence of enamel, scratches, weak adhesion of the enamel; and
- b) complete absence or poor distribution of the gasket compound or the use of the wrong type of material.

All pallets and cartons of container bodies, ends, retort pouches or glass containers are handled in such a way that the likelihood of damaging them is avoided.

The company is to follow these procedures:

1. torn or damaged packing or obvious physical damage to retort pouches, container bodies or ends are identified when containers are received;
2. if the condition of retort pouches, empty containers or ends is not satisfactory, the problem lots are refused or are 100% culled;
3. pallets or cartons of retort pouches, container bodies or ends that have been dropped or damaged during handling or damaged during storage, are separated from the total inventory and held back from production until the pallets can be 100% visually inspected; and
4. all defective retort pouches, containers and ends are carefully controlled for either disposal or return to the manufacturer.

Verification

Determine that all lots of containers and ends arriving at the plant are inspected by qualified personnel who ensure that all pallets and cartons of container bodies, ends, retort pouches or glass containers are handled in such a way that the likelihood of damaging them is avoided.

EMPTY CONTAINER HANDLING**2.3 RECEIPT OF EMPTY CONTAINERS AND ENDS (cont'd)**

Determine that the measurements and inspection procedures used are those recommended in the Recommended Canadian Code of Hygienic Practice for Low-Acid and Acidified Low-Acid Foods in Hermetically Sealed Containers (Canned Foods).

Check container handling and storage practices for situations which could result in damage or contamination.

Ascertain if container integrity defects are identified and classified in accordance with the Government of Canada Metal Can Defects - Identification and Classification Manual, or the Flexible Package Integrity Bulletin (National Food Labs Inc. (formerly National Food Processors Association - NFPA) Bulletin 41-L).

EMPTY CONTAINER HANDLING**2.4 RECORDS ACCURATELY COMPLETED****Reason**

Records must be kept on the container lots and compiled in such a manner that container lots may be related to finished product-container codes, in order to be able to back-track to the sources of problems.

Compliance

Qualified personnel complete an inspection of a representative sample of containers and ends before use in production and the results are recorded.

Plant personnel inspect container integrity by following an inspection schedule, which contains details on the type of test, frequency and sample sizes.

Each pallet or carton of container bodies and ends has a manufacturer's identification ticket attached. Each lot of container bodies and ends has an identifying code so that container manufacturing information may be obtained. These records relate the usage of the container ends and container bodies to the finished product-container codes. Pallet identification tags from the container supplier are used. The ticket is placed, or recorded, in a reference file.

Accurate records of empty container and end inspections are kept by plant quality control and maintained for a period not less than 36 months.

Dates of receipt and dates of use of every lot of containers and ends is recorded and kept on file for at least 36 months.

Verification

Obtain a list of all of the empty container-handling records being maintained by the production and quality-control personnel, and check them carefully to ensure that all required empty container-handling records exist and are accurate and are up-to-date.

Determine the amount of time that the company keeps the records on file.

RETORT OPERATIONS

3.1 APPLICATIONS GENERAL

FIR, PART IV, CANNED FISH, SECTION 34

Canned fish shall be sterilized by a method approved by the Minister.

FIR, SCHEDULE II, SECTION 15

A record of the sterilization treatment used for each batch of fish shall be kept on file at the cannery for a period of not less than twelve months.

FIR, SCHEDULE II, SECTION 16, CANNERIES

Water used for cooling canned fish shall be chlorinated to give a chlorine residual of at least two parts per million, except where canned fish is cooled in a retort using a water supply approved by the Minister.

FIR, SCHEDULE II, PART II, SECTION 26

Floors in wet-working areas shall be kept clean and shall be thoroughly washed and disinfected daily.

FIR, SCHEDULE II, PART II, SECTION 27

Canneries and all equipment and utensils used in the operations of a cannery shall be kept in good repair and in a clean and sanitary condition.

RETORT OPERATIONS

3.2 AREA SANITATION

Reason

The areas around all retorts must be kept clean and sanitary to prevent contamination of the product.

Compliance

All areas around the retorts, particularly those where carts or baskets of processed product are handled, transported through, or removed from the retort, are kept in a clean and sanitary condition.

Floors do not have areas of standing water which result in splashing of contaminated water from the wheels of the retort baskets or carts.

The handling of wet containers after retorting and prior to cooling is prevented. The retort baskets are handled only by plant personnel wearing clean gloves that have been sanitized.

Verification

Determine that the area is restricted to authorized personnel working therein and maintained in a clean and sanitary condition.

Examine the procedures for handling retort baskets when they are being moved from the retort to the post-process area.

Determine that containers are not being handled while hot and wet.

Note whether there is any standing water on the floor which would splash from the wheels of retort baskets or carts onto the underside of the processed containers.

RETORT OPERATIONS

3.3 CONTAINERS RETORTED WITHOUT DELAY

Reason

Time lapse is controlled to minimize microbial growth and prevent the formation of heat stable toxins (*S. aureus* enterotoxin). Prompt retorting may also be necessary to maintain the heat transfer characteristics of the food and the specified minimum initial temperature.

This is a complex issue and there are many factors that can impact on the safety of the product such as the initial microbial load, the ambient temperature, the product temperature, the type of product and product pretreatment.

Compliance

Conditions which may permit the production of heat-resistant toxins in fish and other ingredients are controlled.

Generally, elapsed time from sealing to retorting does not exceed one hour unless:

- the manufacturer can demonstrate that the product is commercially sterile and is free from toxins under the most extreme time, temperature and product conditions
- sealed product is held at temperatures that will not permit the growth of micro-organisms that could impact on the safety of the process (less than 4°C or greater than 65°C)
- the heat transfer characteristics of the product are not affected

The manufacturer has control over the time lapse between sealing and retorting, e.g., reporting of line breakdowns or interruptions that may result in excessive lapse times.

If the time lapse exceeds that demonstrated by the manufacturer to be safe, the product is treated as a process deviation and is held for safety evaluation.

If there are line breakdowns or interruptions, the manufacturer processes the product in partially filled retorts to ensure that the maximum lapse time is not exceeded.

RETORT OPERATIONS

3.3 CONTAINERS RETORTED WITHOUT DELAY (cont'd)

To measure the Initial Temperature (IT)

The thermometer is inserted so as to determine the product temperature of the coldest container to be processed at the time the sterilization cycle begins.

In determining the IT, it is standard procedure to establish the minimum IT which is present in the retort load. In a crateless retort use the last few containers entering the top of the retort, or the temperature of the cushion water, or the first container of the retort batch prior to retorting, whichever is coldest.

Product lots with an IT lower than that established in the scheduled process are segregated as a process deviation and reviewed by a thermal process specialist.

Verification

Verify that the requirements stated under Compliance are met.

RETORT OPERATIONS

3.4 COOLING WATER

Reason

The water used for cooling containers could be a source of contamination to the product or to the retort environment.

There is a correlation between the microbial population present in post-process cooling water and the rate of container spoilage. Increased contamination of cooling water causes a proportional increase in product spoilage in the containers.

The water used for cooling containers must be of good quality and must be chlorinated to minimize the chance of contamination. A measurable level of free chlorine residual is required in the cooling water at the discharge end of the retort. The presence of a chlorine residual at the discharge indicates there has been sufficient chlorine in the water during the cooling cycle.

The amount of chlorine needed and the contact time required to inactivate bacteria cells and spores depends on initial water quality, pH and water temperature.

The acidity of the cooling water is best in the 6 to 7 pH range, to minimize the detrimental effect of pH on the effectiveness of the chlorine.

When containers are cooled quickly to between 35 and 40 °C (95 and 104 °F), the potential for thermophilic growth and the development of corrosion on the container exterior from insufficient drying is reduced.

Compliance

Free residual chlorine tests are made at the retort overflow, drain or tank discharge. Free residual chlorine is measured at least twice per packing shift. The results are recorded and maintained for a period not less than 36 months.

The cooling water receives sufficient chlorine and contact time to produce a measurable level of free chlorine in the cooling water after the cooling cycle.

The acidity of the cooling water is near the 6 to 7 pH range.

RETORT OPERATIONS

3.4 COOLING WATER (cont'd)

The cooling water is discharged after the completion of the container cooling cycle.

At all times throughout the cooling process, there is a measurable level of free chlorine at the discharge end of the retort.

Care is taken to ensure the levels of chlorine are not so high as to damage the exterior finish of the containers.

When the water used for cooling is used for more than one batch it is circulated in a closed system through filters, holding tanks and treated to ensure that its quality meets the same conditions as required for an original supply, as described above.

Where an alternative method of treatment is used, it must be equivalent to the use of chlorine.

Verification

Check the source and quality of the cooling water. Unless an alternate treatment method is used, all retort cooling water must be chlorinated or otherwise sanitized to a point where there is a measurable level of free chlorine, at the point of cooling water discharge.

If an alternate method of treatment is used, check its reliability and effectiveness as compared to the use of chlorine.

Check the contact time allowed after the introduction of the chlorine to verify it is sufficient.

Determine the frequency of chlorine tests that are made on the retort cooling water.

Check that any recirculated cooling water is properly filtered and treated in a closed system before it is used a second time.

RETORT OPERATIONS

3.5 DIVIDERS AND SEPARATORS

Reason

Dividers and separators must be of approved design and construction and maintained in good condition such that they do not contribute to container damage.

If any other means is used to separate layers of containers, other than using dividers made of acceptable materials, with the proper sized and spaced holes, there may be interference with the circulation of the heating medium which will cause underprocessing.

Stacking of more than one divider may result in the blockage of the holes and thereby impair steam/water circulation during the thermal process.

Compliance

The dividers used fit the retort baskets such that there are no gaps or spaces between the divider and the basket which would allow nesting of cans.

Metal dividers are not damaged and are maintained in good condition, such that they will not result in container damage.

When dividers are placed on the bottom of retort baskets to minimize container abrasion, temperature distribution tests are performed with the dividers in place.

Only single dividers are used between layers in retort baskets.

Burlap sacks, boards, sugar sacks, towels or other similar materials for separators within the basket or buggy are not used.

Verification

Observe the condition of the dividers and separators to determine that they are not damaged.

Determine that only single dividers are being used.

Determine the practice used to mark and separate code changes.

Determine that, where dividers are used, cans do not nest.

RETORT OPERATIONS

3.6 LOADING BASKETS

Reason

Seams may be damaged or the container bodies dented during the loading if they are not handled carefully. Metal containers are also susceptible to vacuum loss due to rough handling.

Jumble pack is not permitted for containers which nest unless the heat process was developed with containers nesting as a variable.

Retort pouches may be punctured or scratched due to rough handling.

Compliance

When loading containers into the retort basket, care is taken to ensure that retort pouches or containers and double-seams are not damaged. Dropping or banging containers during loading is avoided. In jumble packs, containers are cushioned by water or other means to slow the impact and minimize denting. All containers which are dented or damaged are removed.

When loading the retort basket, containers are arranged so that the flow of steam will not be impeded.

When loading retort pouches into the racks, the loose edges of the pouches may overlap but the product inside the pouch must not overlap. The flow of steam is maintained around the pouches by the false bottom of the racks.

Containers are loaded into baskets in such a manner so as to prevent damage to the containers.

Records of basket loading are made. Basket loading records indicate approximate number of containers, container size, code, and time on the clock when loading of the basket was started and completed.

RETORT OPERATIONS**3.6 LOADING BASKETS (cont'd)****Verification**

Verify that there is no rough handling of the filled, sealed containers on route to the retort which may induce seam defects or other damage. The dropping of filled, sealed containers into baskets, without some kind of cushioning, is not acceptable.

Observe the arrangement of containers for loading to the retort. Verify that it is consistent with that specified in the scheduled process.

Verify that the required records are completed promptly, legibly, and accurately.

RETORT OPERATIONS

3.7 PROCESS INDICATORS & TRAFFIC CONTROL

Reason

It is vital that an effective means be used to prevent uncooked product from by-passing the retort. In batch operations the sterilization status of the containers must be clearly indicated.

All retort baskets, trucks, cars or crates containing unretorted food product or at least one of the containers on the top of each basket must be plainly and conspicuously marked with a heat-sensitive indicator, or by other effective means, which will visually indicate whether or not the unit has been retorted.

Heat-sensitive indicators such as paint, tape or tags are available for this purpose. After they are used they must be removed and stored, or recorded, to provide verifiable information that each retort basket in each retort load was subjected to heat such as in a retort. Colour change systems are only an indication that containers have been subjected to heat, and are not a verification that an adequate heat process was performed.

It is essential that a system for product traffic control in the retort room be established to prevent unretorted product bypassing the retort process and being mixed with retorted product.

All baskets and crates are clearly marked with heat-sensitive indicators that undergo changes in appearance after exposure to a high temperature. These are heat specific in that the process temperature has to have been attained to result in the colour change. This, however, does not ensure adequate processing time.

Compliance

A traffic-control system such as a double-ended retort, a barrier, gate or other suitable device is installed to ensure that no uncooked containers in any form of conveyance can by-pass the retorts.

Retorts are not closed temporarily during loading. They are closed only when the retort operator is ready to start the process.

RETORT OPERATIONS

3.7 PROCESS INDICATORS & TRAFFIC CONTROL (cont'd)

Heat-sensitive indicators are marked with the code or lot number and the clock time when the first container is placed into the basket.

Each retort basket, truck, car or crate used to hold containers in a retort, or one or more containers therein, are marked with a heat-sensitive indicator, or by other effective means, to indicate visually those units that have been retorted.

Information based on colour change only, on heat-sensitive indicators, must not be used to check that adequate heat processing has occurred.

Visual checks are made to determine whether or not, as a result of retorting, the appropriate change has occurred in the heat-sensitive indicator for all retort baskets, trucks, carts or crates.

If there is any uncertainty as to whether containers have been subjected to the heat process, they are immediately retorted, and segregated for further evaluation, or destroyed.

After containers have been processed, cooled and either boxed or bright stacked, each retort heat-sensitive indicator is removed and stored or recorded, for verifiable evidence that the retort baskets were subjected to a heat process.

Records of the visual checks of the heat-sensitive tags and resultant actions taken are made and kept for the minimum of 36 months.

Verification

Observe the procedures used in the post-process area to determine that all baskets are being retorted.

Observe whether all retort baskets containing unretorted containers, or as a minimum practice, some of the containers on the top of each basket, are plainly and conspicuously marked to indicate that the containers require processing.

RETORT OPERATIONS

3.7 PROCESS INDICATORS & TRAFFIC CONTROL (cont'd)

Determine the marking system used to identify unretorted and retorted containers, specifically determine which colour indicates processed and which colour indicates unprocessed product.

Observe the traffic pattern for baskets of uncooked containers and for the baskets of cooked containers for each retort installation.

Determine if baskets of uncooked containers could by-pass the retorts. If it is possible, discuss with the processor the need to have physical barriers to prevent this from ever happening.

Ensure that colour-changing tags or paint are not being used to check that adequate heat processing has occurred.

Check the company records maintained for this area.

Determine the procedures used by the company when dealing with containers of unknown status with respect to processing.

RETORT OPERATIONS

3.8 RECORDS ACCURATELY COMPLETED

FIR, SCHEDULE II, SECTION 15

A record of the sterilization treatment used for each batch of fish shall be kept on file at the cannery for a period of not less than twelve months.

Reason

Records of sterilization treatment show the results of verification and confirm the effectiveness of process controls.

Compliance

Permanent process records are prepared clearly and promptly as the various steps of the retorting process are completed.

The recorder chart identifies retort number, date, product, batch, retort operator's name and reviewer's name.

The initial temperature (IT) on every retort load for every container/product type is determined and recorded in the retort log.

Retort logs must include the following information:

- a) company and plant name
- b) address
- c) registration number
- d) date of processing
- e) retort operator's name
- f) retort operator's signature
- g) product processed
- h) style of pack
- i) company code - numbers and/or letters for:
 - product
 - establishment
 - day, month and year
- j) approximate number of containers in the retort batch
- k) container size
- l) scheduled process time and temperature requirements
- m) IT of product
- n) retort number
- o) chart number from the temperature recorder
- p) "venting time" from start to closing of the vent valve

RETORT OPERATIONS**3.8 RECORDS ACCURATELY COMPLETED (cont'd)**

- q) time on the clock that the cook or scheduled process starts
- r) temperature readings from the MIG thermometer
- s) temperature readings from the temperature recorder/controller
- t) readings from the pressure gauge
- u) estimated time steam should be turned off
- v) actual time steam is turned off, end of cook
- w) actual processing/cooking time, in minutes
- x) residual chlorine in cooling water is at least at a measurable level

Verification

Review the records being maintained by the production and quality-control personnel, and check them carefully to ensure that all required records exist and are accurate.

Observe whether the required retort records are prepared clearly, promptly and permanently, as the retorting procedures are being carried out.

RETORT OPERATIONS

3.9 RECORDS AND CHARTS KEPT ON FILE

Reason

In case problems develop in the finished product, a record of inspections by quality control must be available to evaluate whether all aspects of the scheduled process are under control and recorded.

Compliance

Records are retained for a minimum of 36 months, preferably for a period that exceeds the shelf life of the product.

Verification

Determine that accurate retort records are available for inspection by the CFIA and that they are maintained up-to-date at all times and determine the period of time that the records are retained.

RETORT OPERATIONS

3.10 RETORT OPERATOR QUALIFICATIONS

Reason

To ensure adequate commercial sterilization of canned fish, retort operators must be certified or under the continuous supervision of a certified retort operator.

Compliance

The designated person in control of the retort operations has successfully completed a recognized course in thermal processing and retort operation.

Verification

Identify the designated retort operators and determine that they are qualified.

This requirement is met by the operator having successfully completed a thermal-processing course offered by one of the following institutions:

British Columbia Institute of Technology - Burnaby, B.C.

Holland College - Summerside, P.E.I.

Institut de Technologie Alimentaire et Agricole - St.
Hyacinthe, Que.

St. Clair College, Windsor, Ont.

Technical University of Nova Scotia, Halifax, N.S.

Newfoundland and Labrador Institute of Fisheries &
Marine Technology, St. John's, Nfld.

University of Guelph, Guelph, Ont.

SEAM INSPECTION PROCEDURES

4.1 APPLICATIONS GENERAL

FIR, GENERAL, SECTION 24

No person shall export or import or attempt to export or import containers of fish

- a) that have not been properly sealed
- b) the tops or bottoms of which have been distorted outwards, or
- c) that are otherwise defective.

Reason

Proper sealing of the container depends upon the precise formation of the double seams. In order to consistently produce high-quality double seams, constant attention must be given to the adjustment and the maintenance of the seaming equipment. Routine scheduling of seam inspections must be performed to give correct information on the adjustment of the seaming equipment.

For retort pouches, proper sealing depends on the precise application of heat and pressure to the sealing bars. In order to consistently produce proper seals, constant attention must be given to the adjustment of the alignment of the sealing bars, the temperature and pressure settings and the protective cover of the sealer bars must be regularly inspected for deterioration.

Compliance

Visual examinations of the containers coming from the seamer must be made at frequent intervals, not exceeding 30 minutes, in order to detect any abnormalities. External seam inspections should be completed by qualified staff, examining each container carefully under good lighting conditions.

Complete double-seam inspections, including tear-downs, must be done on a regular schedule, in order to ensure that the double seams conform with the container manufacturer's guidelines.

Plant personnel inspect for container integrity, container code legibility and accuracy and double-seam compliance in accordance with the Canadian Food Industry Code of Practice or those procedures specified by the can supplier, where equivalent.

SEAM INSPECTION PROCEDURES

4.1 APPLICATIONS GENERAL (cont'd)

Qualified personnel complete a top double-seam teardown inspection of one filled container from every container seaming head operating in the plant. Water-filled cans may be used at line start-up, otherwise production teardowns are performed on containers filled with product. This procedure is carried out at least once every 4 hours of seamer operation, after a jam-up, or after a lengthy shut down and the results are recorded.

Tear-down examinations are also done:

- a) at start-up;
- b) after work has been done on the seamer;
- c) after a prolonged shutdown;
- d) after a seamer jam-up; and
- e) after changing container size or body and end material.

Whenever defective container seaming heads are adjusted or repaired, the double seams are re-tested and pass inspection before the seamer is put back into production.

Seaming operations are stopped when container integrity defects are found, or when the double seam dimensions are determined to deviate from the container maker's guidelines or specifications.

Accurate records are kept for a period of not less than 36 months and consist of:

- a) container integrity inspections;
- b) double-seam teardown examinations; and
- c) seamer operating and maintenance records.

Qualified plant personnel conduct inspections and tests of retort pouch seals following appropriate methods and frequencies. Water-filled cans may be used at line start-up, otherwise production teardowns are performed on containers filled with product.

For retort pouches, burst tests are performed for each position of the sealer:

- a) at start-up;
- b) after work has been done on the sealer;
- c) after a prolonged shutdown;
- d) after a jam-up; and
- e) at approximately every 1 hour of operation.

SEAM INSPECTION PROCEDURES

4.1 APPLICATIONS GENERAL (cont'd)

For retort pouches, qualified staff must examine 100% of the pouches coming from the sealer in order to detect abnormalities. Burst or pressurization-hold tests are performed on a regular schedule to ensure that the seals are adequate.

For retort pouches records are kept for a period of at least 36 months which consist of:

- a) seal strength burst tests;
- b) residual air tests;
- c) container integrity inspections; and
- d) sealing machine operating and maintenance records.

Verification

Ensure that measurements and inspection procedures used are equivalent to those recommended in the Recommended Canadian Code of Hygienic Practices for Low-Acid and Acidified Low-Acid Foods in Hermetically Sealed Containers (Canned Foods).

For retort pouches, ensure that measurements and inspection procedures used are equivalent to those recommended in the CGSB National Standard of Canada "Use of Flexible Pouches for Thermally Processed Food".

Determine that the qualifications of the individuals making the closure examinations and equipment adjustments are acceptable.

Determine who has the authority to stop the production line if the container seams fall outside the operational specification and record this information.

Determine what action is used to evaluate containers which may have been improperly sealed prior to the identification of a problem at the seamer.

SEAM INSPECTION PROCEDURES**4.2 RECORDS ACCURATELY COMPLETED****Reason**

In case problems develop in the finished product, a record of inspections by quality control must be available to verify that all aspects of the seaming operation were under control, and recorded.

Hermetically sealed containers must protect the thermally processed contents from recontamination with microorganisms. Thus, container integrity is critical for the safety and shelf stability of canned foods.

Batch-coding and production records facilitate the isolation of lots which may be abnormal or pose a potential health hazard.

Compliance

Permanent records for container double seam, glass container closure, or retort pouch seals are prepared legibly, promptly and accurately.

Verification

Determine what container closure or retort pouch sealer records are maintained, and check them carefully to ensure that all required records exist and are accurate.

Observe whether the required container closure records are prepared clearly, promptly and permanently, as the container closure examinations are carried out.

SEAM INSPECTION PROCEDURES**4.3 RECORDS ACCURATELY KEPT ON FILE****Reason**

Seam inspection records are essential to the plant management, as they provide a record of activities in case any abnormalities develop in the product. Review of production records is one method of monitoring the efficacy of the quality-control procedures in place.

Compliance

Records are retained for a minimum of 36 months and preferably for a period that exceeds the shelf life of the product.

Verification

Determine that accurate container-closure records are available for inspection by the CFIA and that they are maintained up-to-date at all times, and determine the period of time that the records are retained.

STERILIZATION PROCESSES AND PROCEDURES

5.1 APPLICATIONS GENERAL

FIR, PART IV, CANNED FISH, SECTION 34

Canned fish shall be sterilized by a method approved by the Minister.

Reason

In order to ensure adequate sterilization of canned fish it is important to have set procedures so that the instrumentation and the process controls are operated properly.

Compliance

The temperature standard is the mercury-in-glass (MIG) thermometer and the time standard is the wall clock.

The temperature recorder is used only as a record of the process time and temperature.

The time on the recorder chart is in agreement with the actual time of day as indicated by the wall clock. Temperature-recording charts are checked and adjusted by the retort operator or a qualified technician.

All times being recorded are taken from the wall clock which is positioned in a location that is clearly visible from the retort operator's station. Operators do not use wrist watches or pocket watches. Clocks with sweep second-hands are adjusted so that they agree with the minute hand.

During the processing, bleeders, particularly those in thermometer and temperature-sensing bulb wells, are examined by the retort operator to ensure that steam is continuously flowing from each bleeder location.

During the processing, condensate drain valves or traps are inspected by the retort operator to ensure that condensate is continuously removed from the retort.

After the retort procedure has been completed, the retort operator ensures that the valve on the water line to the retort has been securely closed and is not leaking.

STERILIZATION PROCESSES AND PROCEDURES

5.1 APPLICATIONS GENERAL (cont'd)

In the case of water cooks, after the come-up time has been completed, the retort operator ensures that the valve on the water line to the retort has been securely closed and is not leaking.

MIG thermometers and pressure gauges are located such that they are easily read by the operator.

Pressure gauges and thermometers are tested for accuracy, tagged and labelled. Each gauge has a tag or other method of identification that indicates the date on which it was last checked for accuracy, the standard or test method used and the person who performed the test.

Verification

Determine that the verification requirements as detailed in Chapter 5, Subject 2, Section 3, Retort Controls and Instrumentation and Section 4, Retort Equipment, are met.

Inspect every pressure gauge and MIG thermometer to determine that they have been checked against an accurate standard, certified and tagged (or provided with some other method of identification) showing the date and person who performed the test.

If the mercury column is broken or the thermometer is inoperative or has not been certified, it must be replaced with a certified and fully operative thermometer, before any further production. Determine if any product may have been processed while the thermometer was inoperative or uncertified.

If the original MIG had been giving false readings, then an investigation of all conditions must be carried out, on the assumption that there has been a deviation from the scheduled process. Determine if any product may have been processed while the thermometer was inoperative or uncertified.

Determine the procedure being followed by the retort operator in operating bleeders and condensate drain valves and the frequency of observing that steam traps are in operation. Ensure that visibility is not obscured in the retort area.

STERILIZATION PROCESSES AND PROCEDURES

5.2 FILED PROCESS POSTED

Reason

Schedules of filed processes for each container size, type and style of product must be posted near the retort operator's station or be readily available to the retort operator, so that there is no misunderstanding of the proper process to be followed.

Compliance

The scheduled process, including the vent, being followed at any particular time, is displayed at the retort operator's station.

The procedures posted, or made available to the retort operator, include specific instructions to follow in the event of a process deviation.

The time and temperature of the process are equal to or exceed those stipulated in the filed scheduled process.

Verification

Check the retort room or area to determine that the company has posted their filed scheduled processes, including venting schedules, for all types and sizes of containers and products being processed.

Determine what contingency plan is available to the retort operator in the event that a process deviation occurs and ensure that it is adequate.

STERILIZATION PROCESSES AND PROCEDURES

5.3 PROCESS SUBMITTED AND FILED

Reason

Scheduled processes are submitted to, and filed with, the CFIA Regional Inspection designate prior to their use in commercial production. Information must include all information contained in the CFIA "Submission for Filing of a Scheduled Process for Canned Fish and Fish Products".

Compliance

All retort processes including vent time and temperature, cooking time temperature and all critical factors of the process are submitted, on the CFIA form, and filed with the Regional Inspection designate prior to production.

Verification

Determine that processes being used in the cannery have been filed.

STERILIZATION PROCESSES AND PROCEDURES

5.4 PROCESSING ACCORDING TO FILING PROCEDURES

Reason

The actual procedure for processing in retorts is a predetermined sequence of setting of controls and the opening and closing of valves for specific lengths of time, which ensures that each of the three operations are performed correctly.

Commercial Sterility of Fish - Conditions obtained in a fish product which has been processed by the application of heat, alone or in combination with other treatments, to render the food free from viable forms of microorganisms, including spores, capable of growing in the foods at temperatures at which the food is likely to be held during storage and distribution.

Come-up Time - The come-up time is measured from the time the steam is turned on to the time the process temperature is reached in the retort. Within the come-up period, the retort operator must precisely follow a "venting schedule", which specifies a minimum time and a minimum temperature, to ensure that all air is removed from the retort before closing the vent valve.

Cook Time - After the retort has been thoroughly vented and the processing temperature has been reached, the timing of the process is started. During the cook process, it is very important that the retort temperature remains constant and that an accurate clock or timing device is available to time the process.

Throughout the cook process it is important that the retort operator maintains precise control on the temperature and the time. Any error in either time or temperature of the process will have an effect upon the total sterilizing value of the process.

Come-Down Time - After the processing period is completed, the pressure in the retort and in the canned products must be reduced to atmospheric (or zero-gauge) pressure.

Various cooling procedures may be used depending on the retort installation, the size of the container being processed and the type of product.

STERILIZATION PROCESSES AND PROCEDURES

5.4 PROCESSING ACCORDING TO FILING PROCEDURES (cont'd)

Water cooling should not reduce the temperature of the container below the point at which its surfaces will be dried by the residual heat in the container. Each container must retain sufficient heat to quickly evaporate any water droplets left on the container after retorting. Failure to do this may cause external corrosion of the container.

Compliance

The sequence of events and the times required are described in the detailed operating instructions and must be precisely followed.

Minor differences in valve adjustments, to account for unusual conditions in the retort, such as partial retort loads, are the only variations on the established procedure that are acceptable.

Verification

Observe and verify that all specifications of the scheduled processes are followed, including:

- a) venting schedule;
- b) bleeders operating;
- c) the MIG thermometer, and not the recorder chart, used as the temperature reference;
- d) the correct temperature/pressure correlation exists between the MIG thermometer and the pressure gauge;
- e) the wall clock used as the time reference; and
- f) condensate removal.

Verify, at the retort station, that the appropriate time and temperature are being adhered to on an on-going basis by ensuring that all systems, equipment, and operational aspects are functioning properly. Review, as applicable, plant quality-control records, process logs, cannery defects records, product analysis in pack, vacuum, indicator heat tags, chlorine residual recordings, and retort maintenance logs to ensure requirements are met. Also any other relevant information specific to the operation is to be reviewed.

STERILIZATION PROCESSES AND PROCEDURES

5.4 PROCESSING ACCORDING TO FILING PROCEDURES (cont'd)

Observe and confirm that the steam-line pressure does not fall below the required pressure at retort, when venting other retorts, or during any peak load period.

Observe whether required process records are prepared clearly, promptly and permanently as the various steps of the process are completed.

Verify that operators do not allow entry of unauthorized personnel into the retort area, and take necessary precautions against unauthorized changes in process operation.

STERILIZATION PROCESSES AND PROCEDURES

5.5 PROCESS DEVIATIONS

Reason

All deviations from the scheduled process, and the associated critical factors, must be thoroughly evaluated because of the potential for risk to health and/or safety.

Compliance

Deviations from the scheduled process are thoroughly documented and evaluated by the thermal process specialist. The company quality-control personnel ensure that the causes for deviations are corrected and properly documented. Problems causing deviations and their solutions are recorded in a completed deviation record.

Upon discovery of any deviations in retorting, the plant quality control is notified. All implicated product must be identified, segregated and controlled until corrective action is taken. Immediate action is taken to ensure that the deviation does not recur and increased monitoring of retort operation is initiated to verify that the problem has been corrected.

The retort records clearly indicate that a deviation has occurred.

The following information must be available along with a process deviation record:

- a) date and time of deviation;
- b) retort identification;
- c) nature and scope of the deviation;
- d) product description;
- e) code and quantity;
- f) corrective action taken (or under consideration), including product disposition; and
- g) the name and signature of the thermal process specialist.

Verification

Review retort charts and log book to determine normal operating procedures. Determine who has responsibility for checking records and documentation.

STERILIZATION PROCESSES AND PROCEDURES

5.5 PROCESS DEVIATIONS (cont'd)

Determine that the company management has provided the retort operator with a contingency plan, in writing, which must be followed when a process deviation occurs.

The process deviation information may be initiated on the retort operator's records; however, a complete record of all required information on the process deviations will be the main reference. This record may be in the form of a permanent file or log book.

Review documented process deviations to determine that actions taken by the company after the identification of a deviation meet the requirements listed in the compliance section.

Records must include:

- a) a written review of the deviation;
- b) decision on product isolation and control;
- c) product disposition; and
- d) responsibility centre for these decisions.

STERILIZATION PROCESSES AND PROCEDURES

5.6 RECORDS ACCURATELY COMPLETED

Reason

Hermetically sealed containers must protect their thermally processed contents from recontamination with microorganisms. Thus, proper sterilization procedures are critical for the safety and shelf stability of canned foods.

A record of the procedures followed during the sterilization process, and subsequent checks by quality control must be available to verify that all aspects of the sterilization process and procedures were under control, and recorded.

The retort log serves as the official record of the process. This record permits verification of the temperature-pressure agreement, and the delivery of the scheduled process.

Compliance

Permanent process records are prepared legibly, accurately and promptly as the various steps of the process are completed.

Verification

Determine what process records are being maintained by the production and quality-control personnel, and check them carefully to ensure that all required records exist and are accurate.

Observe whether the required process records are prepared clearly, promptly and permanently as the various steps of the process are completed.

STERILIZATION PROCESSES AND PROCEDURES**5.7 RECORDS ACCURATELY KEPT ON FILE****Reason**

Process records are essential to the plant management, as they provide a record of activities in case any abnormalities develop in the product. The retort log and the retort recorder charts provide a record of the scheduled process delivery.

Compliance

Records are retained for a minimum of 36 months and preferably for a period that exceeds the shelf life of the product.

Verification

Determine that accurate sterilization records are available for inspection by the CFIA and that they are maintained up-to-date at all times and determine the period of time that the records are retained.

WAREHOUSING/POST-PROCESS HANDLING**6.1 APPLICATIONS GENERAL****FIR, GENERAL, SECTION 6 (1) (a)**

6. No person shall import, export or process for export or attempt to import, export or process for export:

- (a) any fish that is tainted, decomposed, or unwholesome or otherwise fails to meet the requirements of these regulations.

FIR, SCHEDULE II, SECTION 27, CANNERIES

Canneries and all equipment and utensils used in the operations of a cannery shall be kept in good repair and in a clean and sanitary condition.

FIR, PART III, SECTION 31 (1)

Every carton and case in which containers of fish are packed at an establishment shall be legibly marked on one end in such a manner that the name of the establishment and the day, month, and year of processing can be determined by an inspector.

FIR, PART IV, CANNED FISH, SECTION 34

Canned fish shall be sterilized by a method approved by the Minister.

WAREHOUSING/POST-PROCESS HANDLING**6.1 APPLICATIONS GENERAL (cont'd)****Reason**

If canned fish is not cooled quickly after heat processing, it will continue to cook.

Entry to the post-process and container-cooling area must be restricted to authorized personnel only. The cooling area must be clean and free of sources of contamination which could come in contact with the cooling containers.

Compliance

After the containers have been removed from the retort, procedures are followed to allow the containers to cool.

Entry to the container-cooling area is restricted to persons working therein.

The areas where baskets are tipped and where containers are cooled are maintained in a clean and sanitary condition at all times.

The containers are dried in a clean and sanitary area of the plant which is free from sources which could contaminate the containers with dirt, dust, debris, pooled water or condensation.

Verification

Determine the procedure being followed in the post-process area to cool the containers.

Determine that the post-process area is restricted to personnel working therein and that it is maintained in a clean and sanitary condition.

Observe the normal handling practices and sanitation procedures in the post-process area.

Note whether containers are handled roughly during or after drying.

WAREHOUSING/POST-PROCESS HANDLING

6.2 HANDLING HOT CONTAINERS

Reason

Hot and wet containers are not handled since moisture will aid the transfer of bacteria to the closure area, possibly causing post-retort contamination of the product inside the container.

Protection of the containers must extend to the post-cooling container handling systems. Studies have indicated that high levels of bacterial contamination may develop on wet and soiled post-cooling container handling equipment, even though the cooling water is chlorinated or is of good sanitary quality. Bacterial contamination may be transferred to the seam areas of the containers and may lead to post-process contamination of the product.

When cans are hot and wet, the seam integrity and sealing compound are not secure against microbial entry and cans must not be handled.

Compliance

Workers in the post-process area must ensure that hot and wet containers are not touched by hand and that no impact damage occurs in the moving, or tipping for draining, of the baskets. Clean gloves dipped in disinfectant solution must be worn when handling the baskets and any sudden movement or sharp impacts must be avoided.

Hot containers must be handled carefully and must be protected from rough handling and possible sources of contamination while being cooled.

Post-retort washing of containers after sterilization is not permitted. If final product container cleaning after cooling is required, the company must submit a proposal to the CFIA.

Verification

Confirm that the containers are not washed post-retort.

Confirm that the containers are handled according to the compliance requirements.

WAREHOUSING/POST-PROCESS HANDLING**6.3 RECORDS ACCURATELY COMPLETED****Reason**

A record of the container integrity inspection by qualified personnel must be available to verify that process controls are in place and recorded.

Records of shipping documents must be available in the event that any product recall is necessary.

Compliance

A final product inspection, compliance sampling, or cull reports completed for each lot to document the results of the final product inspection.

Records are available to relate the lot number, product code, production date, and the quantity shipped to the consignee.

Verification

Determine that all required records exist and are completed promptly, legibly and accurately.

WAREHOUSING/POST-PROCESS HANDLING**6.4 RECORDS ACCURATELY KEPT ON FILE****Reason**

In the event problems develop in the finished product, a record is available which documents all pertinent lot information, including product code, additional identifying marks and the quantity shipped to each first destination.

This information will be essential should a product recall be required.

Compliance

Records are retained for a minimum of 36 months and preferably for a period that exceeds the shelf life of the product.

Verification

Determine that accurate shipping records are available for inspection by the CFIA and that they are maintained up-to-date at all times and determine the period of time that the records are retained.

WAREHOUSING/POST-PROCESS HANDLING**6.5 STORAGE/WAREHOUSING****Reason**

As containers are cased or palletized, the results of rough handling will be apparent as dents and distorted double seams.

If retort pouches or containers are placed in cartons, staples must not be used as they may score or puncture the containers.

It is essential that cartons and cases of products be identified by establishment, day code, and other pertinent information, in order to facilitate a recall or the segregation of lots.

Where low-vacuum dud detectors are employed, it is practical to check the container integrity at the point where cooled containers emerge from the cooling process and/or after bright stacking in a warehouse.

The detection of containers with low vacuum (duds) at the earliest opportunity after cooling indicates the number of gross defects in the packaging line, but slow leakage conditions may be missed. Low-vacuum (dud) detection after warehousing for some days removes faulty containers from distribution.

Warehouses must be kept in good repair, clean, have adequate lighting, and walls and a roof which do not leak. All containers must be protected from environmental conditions which will have an adverse effect on the containers or product.

Compliance

Warehouse handling practices and controls maintain container integrity prior to shipping.

Warehouses are in good repair, clean, have adequate lighting, and walls and a roof which do not leak.

WAREHOUSING/POST-PROCESS HANDLING

6.5 STORAGE/WAREHOUSING (cont'd)

All finished product is stored in warehouses with good ventilation and sufficient humidity and temperature control to prevent overheating, freezing, corrosion or chemical reactions which may adversely affect the product. The warehouse is free from other factors which may affect the odour, flavour, colour, texture, nutritive value or shelf life of the product.

A sanitation program is in place in each warehouse or storage location so that all stored final product is protected from dust, dirt, and debris. A corridor is maintained between the product and wall for purposes of inspection, cleaning, and ventilation.

A rodent and insect control program is maintained in the establishment and, where pesticides are used, the application thereof is made under the supervision of a responsible operator using proper equipment, in a manner that prevents contamination of the product.

All cartons and cases in which containers of fish are packed are legibly marked on one end in such a manner that the name of the plant and the day, month and year of processing can be determined by an inspector.

Verification

Observe that the company's handling and storage procedures prevent rough handling practices.

Evaluate plant procedures for inspection of container integrity and labelling.

Evaluate plant procedures for segregation of those lots while stored in the warehouse.

Review records for the results of container integrity inspection and product disposition/distribution.

Note whether there is adequate temperature and ventilation control in the warehouse.

Observe that the codes on the packing cartons and cases are the same as those on the containers packed therein in accordance with section 1.6, Coding, of this subject.

WAREHOUSING/POST-PROCESS HANDLING

6.5 STORAGE/WAREHOUSING (cont'd)

Check that only clean, sound material is utilized for cases, cartons, boxes and shrink wrapping.

Verify that the plant programs for sanitation, insect and rodent control in the warehouse area are satisfactory.