



**ASEAN CRITERIA FOR ACCREDITATION OF  
ESTABLISHMENTS FOR MANUFACTURING MEAT  
PRODUCTS IN HERMETICALLY-SEALED CONTAINERS**



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## 1. PREAMBLE

These criteria have been prepared to meet the requirements of the ASEAN Accreditation Programme. They shall be used as a guideline for the Competent Authorities of ASEAN Member States for the accreditation of establishments for manufacturing meat products in hermetically-sealed containers for the purpose of trade in meat products within ASEAN.

## 2. SCOPE

These criteria shall be applied to establishments manufacturing meat products in hermetically-sealed containers that are intended for export within ASEAN countries. For further reference see Codex Alimentarius - Code of Hygienic Practice for Low-Acid and Acidified Low-Acid Canned Foods, published by the Secretariat of the Joint FAO/WHO Food Standard Programme, Food and Agriculture Organization of the United Nations, Rome.

## 3. DEFINITION

- 3.1 **Canned food** means commercially sterile food in hermetically-sealed containers.
- 3.2 **Cleaning** means the removal of soil, food residues, dirt, grease or other objectionable matter.
- 3.3 **Contamination** means the direct or indirect transmission of objectionable matter.
- 3.4 **Competent Authority in relation to an establishment** means the official authority charged by the government with the control of hygiene including inspection of meat and meat products.
- 3.5 **Disinfection** means the reduction, without adversely affecting the food, by means of hygienically satisfactory chemical agents and/or physical methods, of the number of microorganisms to a safety level that will not lead to harmful contamination of meat and meat products.
- 3.6 **Establishment** means any premise approved and registered by the controlling authority in which meat products are prepared, processed, handled, packaged or stored.
- 3.7 **Hermetic seal** means a seal designed to be secure against the entry of microorganisms
- 3.8 **Hermetically-sealed containers** are containers which are sealed to protect the contents against the entry of microorganisms during and after heat processing.

- 3.9 **Incubation tests** means tests in which the heat processed product is kept at a specific temperature for a specified period of time in order to determine if outgrowth of microorganisms occurs under these conditions.
- 3.10 **Ingredient** means any substance including food additives used in the manufacture or preparation of a meat product.
- 3.11 **Meat** means the edible part of any animal slaughtered in an abattoir, which is fit for human consumption.
- 3.12 **Meat product** means a product intended for human consumption containing meat derived from animals such as cattle, buffalo, goat, sheep, pig and poultry.
- 3.13 **Packaging material** means containers such as cans, bottles, cartons, boxes, cases and sacks, or wrapping and covering material such as foil, film, metal, paper, wax-paper and cloth which are directly and indirectly contacted with meat and meat products.
- 3.14 **Potable water** means water that is pure and wholesome in accordance with WHO requirements contained in the 'International Guidelines for Drinking Water Quality'.
- 3.15 **Retort** means a pressure vessel designed for thermal processing of food packed in hermetically-sealed containers.
- 3.16 **Seals** of a semi-rigid container and lid or flexible container, means those parts which are fused together in order to close the container.

#### **4. VETERINARY PUBLIC HEALTH CONSIDERATIONS**

When reviewing the suitability of an establishment in a foreign country, the areas of considerations shall include:

- a) The animal health status of the domestic animals from which the meat is derived and wildlife in the country of origin, particular attention being paid to animal diseases which will endanger human and animal health.
- b) The legislations of the country for the prevention and control of animal diseases.
- c) The organization structure of the veterinary and meat inspection services in the country.
- d) The implementation of measures to prevent and control contagious/notifiable animal diseases

## **5. ORIGIN OF MEAT FOR PROCESSING**

- a) The establishment is not permitted to receive raw materials (meat or meat products) which have originated from or have been transported through a country not approved by the importing country.
- b) The source of raw materials (meat and meat products) should be listed and approved by the Competent Authority of the importing country.
- c) The integrity of the cold chain of meat used as raw material shall be maintained at all times.

## **6. INFRASTRUCTURE AND SERVICES**

### **6.1 Location**

Shall be suitably located and provided with essential services to facilitate the hygienic, safe and wholesome meat products as follows:

- i) On reasonably high, well-drained ground.
- ii) In an area free from objectionable odors, smoke, dust or other contaminants.
- iii) Suitably taking into consideration future habitation and development so as not likely to create a nuisance or public health hazard.
- iv) Provided with access via road ways suitable for all weather.
- v) Paved road entrances and exits and well maintained, dust-free environment.
- vi) Adequate water supply with sufficient pressure for overall efficient operations.
- vii) A reliable energy supply for efficient and uninterrupted operations.

### **6.2 Services**

#### **6.2.1 General**

- a) Services required for plant operations shall be installed in accordance with appropriate standards and the regulations set by the relevant authorities.
- b) Materials used in the construction shall be suitable for the area in which they are to be installed.
- c) Design and installation shall provide for adequate access for maintenance and sufficient room to work once access has been gained.
- d) At all times, product hygiene shall not be put at risk and consideration shall also be given to safety aspects of installations.
- e) Establishments shall provide adequate working space for the satisfactory performance of all operations.

- f) The construction shall be sound and ensure adequate ventilation, good natural or artificial lighting and easy cleaning.
- g) The buildings and facilities of the establishment shall be kept in good repair at all times.
- h) The establishment shall be of such construction as to protect against the entrance and harboring of insects, birds, rodents or other vermin.

### **6.3 Amenities**

#### **6.3.1 Water Supply**

- a) An adequate supply of potable water with appropriate facilities for storage, distribution, and temperature control, shall be available whenever necessary to ensure the safety and suitability of meat products.
- b) All hoses, taps or other similar sources of contamination shall be designed to prevent back-flow or back siphonage.
- c) Where used, water treatment chemicals shall be from the relevant authority's approved list. The chemical treatment shall be monitored and controlled to deliver the desired concentration and to prevent contamination.
- d) Water supply shall be analyzed by the processor at a frequency adequate to confirm its potability.
- e) Where it is necessary to have a supply of hot potable water provided for purposes of sterilization must not be less than 82<sup>0</sup>C at point of use.
- f) Non-potable water (for use in, for example, fire control, steam production, refrigeration and other similar purposes where it would not contaminate) shall have a separate system.
- g) Non-potable water systems shall be identified and shall not connect with, or allow reflux into, potable water system.

#### **6.3.2 Ice**

- a) Ice shall be made from water that complies with section 6.3.1. Ice shall be produced, handled and stored to protect it from contamination.
- b) Monitoring of ice shall be made at least twice a year and when necessary regardless the establishment produce own ice or out-sourcing.

#### **6.3.3 Steam**

- a) The steam generating plant shall be located so that exhaust gases and fuel receiver and storage facilities do not create a nuisance or a hazard to product hygiene.



- b) Steam used in direct contact with food or food contact surfaces should contain no substances which may be hazardous to health or may contaminate the food

#### 6.3.4 Non-Potable Water

- a) **Non-potable water** used for steam production, refrigeration, fire control and other similar purposes not connected with food should be carried in completely separate lines, identifiable preferably by color, and with no cross-connection with or back-siphonage into the system carrying potable water.
- b) (However, non-potable water may, with specific acceptance by the official agency having jurisdiction, be used in certain food handling areas provided this does not constitute a hazard to health.)

#### 6.4 Storage

- a) Where necessary, adequate facilities for storage of finished products, incoming materials and ingredients, packaging materials and non-food chemicals e.g. cleaning materials, lubricants, fuels, shall be provided.
- b) The type of storage facilities required will depend on the nature of the food. Where necessary, separate and secure storage facilities for food and non-food chemicals such as cleaning materials and hazardous substances shall be provided.
- c) Ingredients used in the plant shall be stored at the proper temperature example ingredients requiring refrigeration shall be stored at 4° C or less.
- d) The temperature of the storage of the ingredients shall be monitored.
- e) Ingredients and packaging materials shall be handled and stored in a manner to prevent damage and/or contamination.
- f) All materials and products shall be stored 150 mm above floor on racks or shelves or pallets and not contact with the wall.
- g) The storage conditions, including temperature, should be such as to prevent deterioration or contamination of the product. Rapid temperature changes during storage should be avoided as this may cause the condensation of moist air on the containers and thus lead to container corrosion.
- h) The storage room shall be dry and shall not have any condensation on the ceiling.
- i) If containers are kept at high humidity particularly for a long time especially in the presence of mineral salts or substances which are even very weakly alkaline or acidic they are likely to corrode.
- j) Labels or label adhesives which are hygroscopic and therefore liable to promote rusting of tinfoil should be avoided as should pastes and adhesives that contain acids or mineral salts.

- k) Cases and cartons should be thoroughly dry. If they are made of wood it should be well seasoned. They should be of the proper size so that the containers fit snugly and are not subject to damage from movement within the case. They should be strong enough to withstand normal transport.
- l) Metal containers should be kept dry during storage and transportation to prevent their corrosion.
- m) The mechanical properties of outer cartons, etc. are adversely affected by moisture and the protection of the containers against transport damage may become insufficient.

## **6.5 Drainage**

### **6.5.1. General**

- a) Three entirely separate drainage systems shall be provided for sanitary (sewage) drainage, processing waste drainage, and storm water drainage. All drainage systems must comply with the requirements of the relevant authority.
- b) Effluent or sewage lines shall not pass directly over or through production areas unless they are controlled to prevent contamination.
- c) All drains in the meat processing areas and meat storage area must be covered.

### **6.5.2. Sanitary Drainage**

- a) Lines from toilets and urinals shall be directed to the sewage system.
- b) The sanitary drainage system shall be designed to eliminate any possibility of drainage backing up and flooding the floors of any processing area.

### **6.5.3 Processing Waste Drainage**

- a) The drainage system from processing areas shall be designed to enable rapid removal of wash down water from the processing floors. The system shall ensure the effective and expeditious removal of plant effluent from the premises.
- b) Adequate drainage inlets shall be strategically located to remove waste water in processing areas and in chillers.
- c) Each drainage inlet/outlet shall be at least 100mm in diameter and be fitted with perforated or gridded drain covers.
- d) Drains shall be equipped with effective P, U or S shaped deep seal traps and adequately vented to the outside atmosphere.
- e) Floors shall be evenly graded to the trapped drainage inlets.

- f) Floor drainage valleys shall be provided with approved covers over walkways and the direction of flow of the drains must be from clean areas to dirty area.

## **6.6 Waste Water Treatment**

- a) Waste water (effluent) treatment facilities shall be located so as not to pose a hazard to food or create an odor or other nuisance to processing areas.
- b) They shall be designed and constructed so that the risk of contaminating food or the potable water supply is avoided.

## **6.7 Waste Disposal**

- a) Adequate facilities and equipment shall be provided and maintained for the storage of waste and inedible material prior to removal from the establishment. The facilities shall be designed to prevent contamination.
- b) Waste shall be removed and containers shall be cleaned and sanitized at an appropriate frequency to minimize contamination.
- c) Waste materials or inedible products shall be placed in non-corrosive watertight containers that are clearly labeled to indicate that the contents are unfit for human consumption.

## **6.8 Sanitary Facilities**

### **6.8.1 Personnel Hygiene Facilities**

- a) Adequate hand washing facilities shall be available. They shall include hands free operated taps, sanitizer, disposable paper towel dispensers and covered, foot operated dustbins.
- b) Suitable and adequately equipped changing rooms for workers shall be provided.
- c) Personal clothing must be kept separate from protective clothing used in the processing area.
- d) Lockers shall be provided for workers to store personal clothes and items.
- e) Adequate number of toilets of appropriate hygienic design shall be provided.
- f) Where appropriate, canteen shall be available.
- g) Toilets, changing rooms, pantries, canteens and staff rest areas shall be separated from and do not open directly into food processing areas.
- h) Such facilities shall be suitably located and designated.

## **6.8.2 Equipment Cleaning and Sanitizing Facilities**

- a) Adequate facilities, suitably designated and located, shall be provided for cleaning utensils and equipment.
- b) Such facilities shall have an adequate supply of hot and cold potable water where appropriate.
- c) These facilities shall be physically separated from the processing area.
- d) Chemicals for sanitation purposes shall be approved by the relevant Authorities.
- e) All chemicals used in the establishment shall be kept under lock and key.
- f) Location of the chemical store shall be away from the processing area.

## **6.9 Temperature Control**

- a) Depending on the nature of the meat processing operations undertaken, adequate facilities shall be available for thawing, heating, cooling, cooking, refrigerating and freezing of meat and processed meat products, for storing refrigerated or frozen products, monitoring product temperatures, and when necessary, controlling ambient temperatures to ensure the safety and suitability of products.

# **7. STRUCTURES AND CONSTRUCTION**

## **7.1 Design and Layout.**

- a) The processing area of meat products must be totally enclosed.
- b) The building shall be designed and constructed so that there is sufficient space to allow for processing, storage, movement of personnel and effective cleaning.
- c) There shall be footbaths, hand washing facilities and appropriate sanitary procedures for all staff and visitors before they are allowed to enter the meat processing areas.
- d) The layout shall be designed in a manner to minimize possible contamination of the finished products. The flow of raw material to finished product during processing, where appropriate, shall be unidirectional.
- e) There shall be complete separation between clean and dirty areas.
- f) There shall be separate entrances for workers in clean and dirty areas.
- g) There shall be no mixing of workers and equipment between clean and dirty areas.
- h) There shall be no criss-crossing of products and waste lines.

- i) The interiors of food processing areas shall be of sanitary design and construction using acceptable non-toxic materials. Light colored finishes shall be used.
- j) There shall not be platforms or structures above the product line.

## **7.2 Walls**

- a) Smooth interior walls shall be constructed of materials which are impervious to moisture, rust resistant, resistant to or protected from impact and not readily subject to chipping or flaking.
- b) Joints and fixing devices shall be sealed effectively.
- c) Horizontal ledges occurring in wall construction shall be sloped down at an angle of at least 45°.
- d) Where internal panel type construction is to be incorporated other than in chillers or freezers, wall panels shall be placed on a concrete plinth raised a minimum of 150 mm above floor level. Such wall panels shall be suitably protected from impact damage.
- e) Internal wall or ceiling surfaces are painted, paint shall be non-toxic and the painted surface shall not contact food. Paint shall be light in color and give a smooth finish that is impervious to moisture. Finished surface shall be able to withstand hosing with detergents and 82°C water, and withstand a reasonable degree of impact.

## **7.3 Floors**

- a) Floors shall be durable, non-slip, without crevices, constructed from non-toxic and impervious material and kept in such good conditions as to enable them to be thoroughly cleaned and disinfected.
- b) Floors shall be evenly graded to drainage inlets so no stagnation of water will occur. Sufficient floor grading as follows:
  - i. Wash areas - 1:25
  - ii. Wet areas - 1:50
  - iii. Other areas - 1:100

## **7.4 Ceilings**

- a) All ceilings shall be constructed and finished as to minimize condensation, mould development, flaking and the lodgment of dirt and shall be kept in such good conditions as to enable them to be thoroughly cleaned.
- b) Joints and fixing devices on the ceiling shall be effectively sealed.
- c) The minimum height of a ceiling in all processing rooms shall be 3 m (or not less than 1 m above rail height).

## **7.5 Coving**

- a) Walls and curbs shall be coved to the floor with a radius of at least 75 mm.
- b) Wall to wall junctions shall be coved with a radius of at least 25 mm.

## **7.6 Doors**

- a) Doors shall be constructed with smooth and non-absorbent surfaces.
- b) Where sheeting is used, joints shall be effectively sealed against moisture entry by continuous welding or other equally effective means.
- c) Doorways through which product are transferred by rail or trolley shall be of sufficient width to prevent contact of the product.
- d) Where appropriate, doors shall be self-closing and close fitting. Strip type P.V.C. type curtains shall only be used on openings through which packaged products pass.
- e) Doors that lead to the exterior shall not have any gaps.

## **7.7 Windows**

- a) Minimal openings from the processing areas to the exterior areas.
- b) Windows and other openings which shall be constructed as to avoid accumulation of dirt and those which open shall be fitted with screens.
- c) Horizontal ledges occurring in window shall be sloped down at an angle of at least 45°.

## **7.8 Air Quality and Ventilation**

- a) Ventilation shall be provided which allow sufficient air exchanges to prevent unacceptable accumulation of steam, condensation or dust and to remove contaminated air.
- b) Ventilation shall be designed and constructed so that air does not flow from contaminated areas to clean areas.
- c) Adequate ventilation to the processing areas shall be provided.
- d) Ventilation openings shall be equipped with close fitting screens or filters to prevent the intake of contaminated air. Filters shall be cleaned or replaced as appropriate.
- e) In microbiologically sensitive areas, positive air pressures shall be maintained.

## **7.9 Lighting**

- a) Lighting provided at product inspection stations shall be 600 lux and at production areas and at other areas at 220 lux.
- b) Shatter proof protective shields shall be provided over exposed lights, particularly where there is exposed food or packaging materials.
- c) Artificial lighting must not alter food colors.

## **7.10 Insect, Rodent and Vermin Proofing**

- a) Exterior openings leading directly or indirectly to production areas shall be insect proofed.
- b) Buildings shall be constructed to be rodent and other vermin proof. Doors shall be tight fitting.

## **8. CHILLERS AND FREEZERS**

- a) Adequate chillers and freezers shall be provided for storage of meat, meat products and ingredients at a constant temperature not greater than those specified in sections 6.4 (c & d).
- b) Chillers and freezers shall be suitably located to minimize the risk of contamination of the materials stored.
- c) A direct or remote thermometer or temperature recorder shall be provided to each chiller or freezer.
- d) Refrigerated rooms shall be designed and operated in a way that prevents the formation and accumulation of condensation on overhead structures and ceilings.
- e) The interior of each door shall be provided with a mechanism to allow personnel to escape if personnel are accidentally locked inside.

## **9. WRAPPING, PACKAGING AND LABELLING**

- a) Wrapping and packaging shall take place in hygienic conditions and packaging shall be carried out in the area provided for the purpose.
- b) Materials used shall be strong enough to protect the meat products during the course of handling and transportation and shall not:
  - Affect organoleptic character of the meat products; or
  - Transmit to the meat products any substance harmful to human health.
- c) Wrapping and packaging materials shall not be re-used.
- d) The packaging of meat products which are not regarded as having undergone complete treatment and are not therefore shelf stable, must bear a clear and legible indication of:
  - The maximum temperature at which the product may be transported or stored; and
  - The period during which preservation may be assured by maintaining the product at such temperature.
- e) The batch number/production date shall be on the packaging to enable trace back and recall.

## **10. HYGIENE AND SANITARY PRACTICES**

### **10.1 PERSONNEL HYGIENE**

#### **10.1.1 Health Status**

- a) Persons known or suspected to be suffering from, or known to be a carrier of a disease transmissible by food shall not be allowed to enter any food handling areas if there is likelihood of their contaminating food.
- b) Any person so affected shall immediately report illness or symptoms to the management.
- c) Medical examination of food handlers shall be carried out as per required by the relevant authorities.
- d) No person with open wounds shall handle meat, meat products or other ingredients.

#### **10.1.2 Personal Cleanliness and Behaviour**

- a) Persons engaged in the handling of meat and meat products shall wear adequate, clean protective clothing, footwear, mask and head covering.
- b) There shall be no mixing of workers and equipment between clean and dirty areas. Clean and dirty workers shall wear different colored uniforms.
- c) Personnel shall wash and disinfect their hands each time work is started and resumed and whenever their hands have been soiled and immediately after using the toilets.
- d) Persons engaged in the handling of unwrapped meat or meat products shall not handle any material likely to cause contamination of the meat or meat products.
- e) Waterproof gloves shall be worn where the handling of exposed meat product is unavoidable. The gloves shall be frequently disinfected or frequently replaced in the course of a working day. Whenever possible mechanical methods shall be used to avoid meat products being touched by hand.
- f) Persons engaged in food handling activities shall refrain from behaviour which could result in contamination of food e.g. smoking, spitting, chewing, eating, drinking, sneezing or coughing over unprotected food.
- g) Personal items such as jewellery, watches, pins or others shall not be worn or brought into food handling areas. These items shall be stored in the lockers.



### **10.1.3 Visitors**

- a) Visitors to meat processing or handling areas shall wear protective clothing and adhere to the personal hygiene provisions in this section.
- b) Visitors shall be accompanied by establishment staff especially in meat processing areas.
- c) Visitors shall always proceed from clean to dirty areas.

### **10.2 OPERATIONAL HYGIENE**

- a) A high standard of cleanliness shall be maintained throughout the premise.
- b) The processor shall have a cleaning and sanitation programme for all the equipment, premises, production and storage areas which specifies areas or equipment to be cleaned, method of cleaning, frequency, types of cleaning chemicals used and the name of responsible person.
- c) Operational hygiene where cleaning programmes to be implemented shall be continually and effectively monitored for their suitability and effectiveness and where necessary, documented.
- d) The establishment shall avoid sweeping and wet cleaning during processing of meat products.
- e) All equipment and implements used in the preparation of meat products shall be cleaned and disinfected as necessary during each working day and at the end of each shift or each working day and before being used again if they have been contaminated. Continuous production machines shall need to be cleaned at the end of each working day and whenever contamination is suspected.
- f) All materials and equipment for maintenance and cleaning shall be when not in use, be kept in rooms provided for the purpose.
- g) When knives and steel sharpeners are used in the meat processing, staff must be provided with sterilizers at 82°C or the knives and steel sharpeners must be regularly collected and sterilized.

### **10.3 PEST CONTROL PROGRAMME**

- a) There shall be an effective and continuous pest control programme for the premises and equipment.
- b) The pest control programme shall include the following:
  - The name of person in the establishment responsible for pest control programme
  - Where applicable, the name of pest control company or the name of person contracted for the pest control programme.
  - The list of chemicals used, concentration, the location where applied, method and frequency of application
  - A map of trap locations.
  - The type and frequency of inspections to verify the effectiveness of the

- programme.
- Records include pest control activities e.g. pesticides used, method and location of application, date of fumigation.
  - Minimum pest control records include results of inspection programmes, including corrective actions taken, findings in traps and locations of insect infestations.
  - Date and person responsible.
- c) Pesticides used shall be registered by the relevant authority.
- d) Pesticides used shall be in accordance with the label instructions.
- e) Treatment of equipment, premises or ingredients to control pests shall be conducted in a manner to ensure that the maximum residue limit of the Codex Alimentarius Commission is not exceeded.
- f) Insectors must not be installed in the processing areas.

## **11. EQUIPMENT**

### **11.1 Type and Material Requirements**

- a) Equipment shall be located so that it functions in accordance with its intended use.
- b) Type of equipment used shall permit adequate maintenance and cleaning and facilitate good hygienic practices. For example, equipment that are durable or movable or capable of being disassembled would allow for maintenance, cleaning, disinfection, monitoring and facilitate inspection.
- c) There shall be no mixing of equipment between clean and dirty areas.
- d) Equipment used to cook, heat treat, cool, store or freeze food shall be designed to achieve the required food temperatures as rapidly as necessary in the interest of food safety and suitability, and maintain them effectively. Such equipment, where necessary, shall have effective means of controlling and monitoring humidity, air-flow and other characteristics likely to have a detrimental effect on the safety or suitability of food.
- e) Containers used for waste and inedible materials shall be clearly identified, leak proof, and where appropriate are covered.
- f) All fixtures, fittings, implements and equipment used in the manufacture of meat products including those which come into contact with meat and meat products during storage shall be made of durable, impervious material, non-corrosive, non-toxic and easy to clean and disinfect.
- g) All equipment for handling meat and meat products and for storing containers shall be so constructed that neither the contents nor the containers come into direct contact with the floor or ground.

## **12. TRANSPORTATION**

### **12.1 Food Carrying Vehicles**

- a) The processor shall verify that food carrying vehicles are suitable for transportation of food or meat products.
- b) The processor shall have a programme in place to verify the adequacy of cleaning of the food carrying vehicles, including free from pest.
- c) Meat products shall be transported in such a way that they are protected from contamination or damage during transportation.
- d) Incoming materials (e.g. meat, non-food, packaging) shall be received in a dedicated area
- e) Where appropriate, materials used in food carrying vehicle's construction are suitable for food contact.
- f) Proper loading and unloading facilities to be provided.
- g) Where appropriate, adequate truck washing facilities shall be provided.
- h) Finished product shall be transported in proper hygienic conditions.
- i) Conditions of storage and transport should be such that the integrity of the product container and the safety and quality of the product are not adversely affected. Attention is drawn to common forms of damage such as that caused by improper use of fork lift trucks.
- j) Warm containers should not be stacked so as to form incubatory conditions for the growth of thermophilic organisms.

### **12.2 Temperature Control**

- a) Frozen meat and other frozen ingredients used in the manufacture of meat products shall be transported in suitably equipped vehicles at temperature that do not permit thawing.
- b) Ingredients requiring refrigeration shall be transported at 4°C or less and are appropriately monitored.
- c) Upon arrival at the meat processing plant, the meat and other ingredients shall be stored at temperature as specified in sections 6.4 (c and d).

## **13. SECTION A – SPECIAL CONDITIONS APPLICABLE TO CANNERIES**

### **13.1. HANDLING OF EMPTY CANS**

- 13.1.1 When empty cans or ends are received from the can manufacturer, a representative number of cans (open ended) and ends should be examined to ensure that they meet the criteria for sound cans: seam measurements should be made on the marker's end; the side seam lap, tabs and score marks should be checked; the ends must at least be visually examined to check for any tabs and score marks and to see that there is sufficient compound, evenly applied. Signs of damage in transport should be looked for. Where cans are made on

the premises, the same checks should be carried out during manufacture.

(For details of seam checking please see paragraph 2.1.4, 2.1.5, 2.1.6, 2.2.2, 2.2.3 and 2.2.5). A written record of these checks must be made and signed by the person carrying out the checks. These records must be retained for 3 years and be made available to the official inspection service at any time during this period.

- 1.2.1 At all times prior to filling, cans and ends should be stored and handled with due care so as to prevent them becoming contaminated or damaged. Damaged or faulty cans should be rejected; they should not be repaired and used by the processor.
- 1.2.2 Before filling, cans should be cleaned mechanically in an inverted position by appliances using air, water or steam under pressure. Use of static water for can cleaning is not permitted. Sufficient time should be allowed for washed cans to drain before filling.

## **2. CONTROL OF CAN SEAMING PROCESS:**

### **2.1 COMPOUND LINE SEAMS**

- 2.1.1 Can seam processes should be kept under constant supervision and monitored by physical “tear down” or by “section” checks and tear down. The efficiency of can seaming should be so checked before production begins or is resumed after a break in production or whenever adjustments are made to the can seaming machinery. Examinations should be carried out on cans filled with product or water before production begins.
- 2.1.2 The frequency of checking during production will vary according to the speed of the line, but on fast lines (for example, 3,000 or more cans per hour) the checks should be carried out on at least one can per hour per seamer head.

On slow lines, such as those where large cans are manually handled, the frequency of checking during production need not be so high, but at least one can per seamer head should be examined during any period of continuous production. During production, checks should always be carried out on cans which have been filled with the product. Since can components will have been checked already at the time of delivery, it will only be necessary to check the canner’s end seam, at this stage.

- 2.1.3 Seams should also be examined visually during production for any abnormalities including excessive drop at the side seam, cut over and

false seams. Visual examination should be continuous on slow lines and periodical on fast lines.

2.1.4 When measuring end seams, measurements should be made on at least three separate points. However in the case of rectangular and trapezoid can, six separate sets of measurements should be made; one at each corner and one at each long side.

2.1.5 In can end seam evaluation the following measurements should be made: seam length, seam thickness, countersink depth; end and body plate thickness; body hook length; cover hook length. The following lists the critical parameters for double seaming:-

- a) Free space – the aim should be for a free space of approximately 0.13 millimeter (0.005 inch) and should be never exceed 0.25 millimeter (0.01 inch). However, in the case of rectangular cans, free space not exceeding 0.33 millimeter (0.13 inch) at any point of the corner is acceptable.
- b) Percentage overlap – an overlap of 60% should be the aim and must never be less than 45%.
- c) The side seam juncture rating should be assessed and the degree of deformation (internal droop) must never be greater than 50% of the end hook length.
- d) The countersink depth should not be less than the seam length.
- e) Tightness rating-the end hook should be visually assessed and graded for freedom from looseness wrinkles. The minimum acceptable value is 70% in the case of round cans, and the straight parts of rectangular cans. The minimum acceptable value is 50% at the corners of rectangular cans.

2.1.6 These measurements may be made using either a micrometer or seam section projector but whichever instrument is used it should be capable of measuring to within 0.003 millimeter (0.001 inch)

2.1.7 Written records of seam measurement should be made and signed by the person carrying out the checks and must be retained for a period of 3 years. These records should be available to the official inspection service at all times.

## **2.2 SOLDERED SEAMS**

- 2.2.1 For pre-soldered double seam process, frequent checks should be made to ensure that the correct temperature and composition of solder are maintained at all times. Equipment used for applying the solder to flange areas of solder is applied. In post-soldered double seam process, regard should be paid to the quantity of solder applied, the temperature of the process and the time allowed ensuring adequate solder penetration. In both soldering methods, can components should be clean and free from oil at all times to ensure satisfactory adhesion of solder.
- 2.2.2 Whichever soldering method is used the aim should be to ensure continuity of solder throughout the length of the seam's circumference. At least 50% of the available space in the sea m should be filled with solder. To check this, can seams should be both sectioned and torn down and examined thoroughly. Signs of excessively tunneling of solder should be looked for.
- 2.2.3 The seaming equipment should be maintained and adjusted to ensure the formation of a sound seam with hooks well inter-locked and free space should not exceed 0.38mm (0.015 inches) in the case of pre-soldered seams are 0.51 mm (0.02 inches) in the case of post-soldered seams.
- 2.2.4 Seam components should be measured to establish the degree of overlap and amount of free space. A sufficient number of cans should be examined to ensure that consistently sound seams are being produced. (For frequency of checking, please see paragraph (2.1.2).
- 2.2.5 Written records of seam measurements should be made and signed by the person carrying out the checks. These records should be retained for 3 years and be available to the official inspection service at all times.

## **2.3 PRESSURE TESTING**

- 2.3.1 In addition to the examinations specified above, pressure testing of cans should be carried out. However, too much reliance should not be placed on pressure testing although it can be a useful aid in the assessment of seam integrity provided that checks are carried out carefully. In this context, sufficient air pressure and sufficient time should be allowed for defects to become apparent.

## **2.4 CAN FILLING**

- 2.4.1 No auto-claving, cooking, heating or retort process may be carried out in any room where cans are filled with a cold meat product, or where such cans are closed and seamed.

- 2.4.2 In establishments where cans are filled with a hot meat product, the separate room required for filling of cans may be waived provided that there is sufficient separation between pre-cooking areas, areas in which cans are filled and seamed, and the areas in which cans are sterilized. The ventilation system in these areas must effectively prevent condensation and hygiene standards should also be high and there should be a logical flow of product with no back-tracking or line crossing.
- 2.4.3 Filled and seamed cans should be thoroughly washed by mechanical means in water at a sufficient temperature to remove grease, fat and dirt from the outside of the can before processing. There should be a minimum delay between filling and processing and where product fills and temperatures are critical to the heat process these should be recorded at sufficient frequency to ensure the standards are met.

## **2.5 PROCESSING**

- 2.5.1 The interior of retorts and retort baskets should be regularly cleaned.
- 2.5.2 Automatic time and temperature recording devices should be fitted to each retort or tank and records should be kept and retained with a minimum period of three years from the date of production and be made available to the official inspection service at all times. The accuracy of this equipment should be checked by calibration at least every 6 months and when necessary.
- 2.5.3 In addition, retorts and processing tanks should be fitted with direct reading control thermometers. Retorts must also be fitted with pressure gauges. The accuracy of these instruments should be checked by calibration at least every 6 months and when necessary.
- 2.5.4 A satisfactory system should be used with baskets of cans to indicate that they have undergone heat processing to an appropriate  $F_0$  value so as to eliminate heat-resistant pathogens, such as *Clostridium spp.* Thermal processing indication (for example, “cook check” or “zebra tape”) should be used, the indicator being placed on a can end. These indicators alone should not be relied on. The whole process should be arranged to allow rapid movement of filled cans to the retorts and to ensure that retort baskets cannot miss the heat process.

## **2.6 CAN COOLING AND DRYING**

- 2.6.1 Water used for cooling should be clean potable water. If can cooling by water is carried out other than in the retorts, extra care should be taken to avoid contamination of the processed cans. Cooling tanks should be

- adjacent to the retorts where the cans have been processed and so sited as to prevent contamination of the cooling water. Tanks should be protected against overhead contamination at all times. There should be a satisfactory thorough flow of chlorinated tanks. Cooling tanks must be subject to a daily cleaning and disinfection programme. There should be an efficient method of mechanical transfer of baskets from the retort direct to the cooling tank.
- 2.6.2 If cooling showers or sprays are used the water should also be clean and potable. Showers must be situated in a separate area where there is no risk of contamination from other processes.
- 2.6.3 If water re-circulated for use in tanks or sprays, it should be subjected to filtration and re-chlorination before use.
- 2.6.4 After heat processing and preliminary water cooling, the cans should not be touched by hand until they are cool and dry and notices to this effect should be posted in cooling and drying areas. Retort baskets should not be over-filled and, if necessary, should be fitted with handles to prevent hands touching the cans. A separate room should be provided for the cooling and drying of processed cans. Alternatively, where such a room is not provided the following conditions should be met:
- a) Adequate space should be reserved for such the can cooling and drying procedures and throughout the plant there should be a satisfactory flow from the raw material to the finished product with no back-tracking which could in any way result in contamination of processed cans
  - b) There should be adequate and efficient ventilation of the can cooling and drying area. Can dryers, if used, should be so designed and constructed as to ensure that only clean, dry air is applied to the cans. Their situation within the plant should be such as to prevent any risk of contamination of the cans from other processes. Can drying rooms and areas should be under the effective control of the inspectorate and the cans should not be removed until they are cool and dry.
- 2.6.5 Can drying areas and all equipment coming in contact with wet cans, especially any can lifting apparatus, runways or belts, should be subject to regular cleaning and disinfecting routines and the highest standards of hygiene should be met in these areas.

At all times processed cans should be handled with care so that they are not damaged and mechanical handling equipment should be constructed and maintained so as not to cause damage to cans. In particular, lifting



apparatus must be so constructed and operated as to avoid the dropping of cans on the floor. Any can falling on the floor during the drying stage should be rejected.

Operatives working in these areas should be trained to work in a hygienic, orderly manner. Hand washing facilities should be readily available to the operatives. Suitable protective clothing should be provided and this should be subject to regular cleaning and replacement. If gloves are worn they should be water-proof and be frequently disinfected (inside and out) or replaced in frequently in course of the working day.

## **2.7 FURTHER HANDLING OF CANS**

2.7.1 Further washing or the used of brushing machines, with or without sawdust, for heat processed cans is not permitted. If cans have to be wiped, disposable paper tissues should be used, one for each can.

2.7.1 Processed cans should be stored off the floor until dry conditions and if the product is not shelf-stable, the cans should be stored under refrigeration. \in such cases storage rooms should be equipped with thermometers.

## **2.8 CONTINUOUS HYDROSTATIC RETORTS**

2.8.1 Continuous hydrostatic retorts operate at a constant steam temperature and have conveyor chains that transport the cans through the retorting system.

2.8.2 The hydrostatic retort does not have any mechanical seals and can operate at steam pressures above atmospheric by supporting the steam pressure with columns of water. The height of these columns depends on the steam pressure (e.g. on the temperature) required.

2.8.3 Continuous hydrostatic retorts should comply with the general requirements of conventional vertical or hydrostatic retorts; however, their unique design requires additional precautions to be taken to safeguard the public health status of the processed meat product.

### **2.8.4 Feed and Discharge Systems**

2.8.4.1 Hydrostatic retorts should provide for complete segregation of processed and unprocessed cans. Ideally to prevent any possibility of mixing processed and unprocessed cans or microbiological cross contamination, the feed and discharge stations should be on opposite sites of the cooker and the same belt should not be used for feeding and discharging cans.

## **2.8.5 Processing**

- 2.8.5.1 Venting should be complete in order to achieve operational temperature, the thermometers should be situated just above the steam/water interface at the base of the steam chamber to detect the minimum operating temperature.
- 2.8.5.2 Every cooker should be fitted with at least 1 pressure gauge.
- 2.8.5.3 Condensate should not be allowed to accumulate in the steam chamber where it may result in lowering of the effective processing temperature for those cans which may pass through it.
- 2.8.5.4 Sight glasses should be fitted to indicate the steam/water interface and the water levels of the pre-heat and pre-cool legs and the condensate level.
- 2.8.5.5 Processing time is a function of chain speed and this should be automatically recorded continuously during processing and correlated with the manufacturer's scheduled heat process.
- 2.8.5.6 The heating process takes place in several communicating chambers and in each of these the temperature should be automatically and continuously recorded where required by the scheduled heat process. Temperatures may therefore need to be recorded at the following points:
  - a. Top and bottom of the pre-heat leg;
  - b. The water seal;
  - c. The steam chamber;
  - d. Top and bottom of the pre-cool leg.

## **2.9 INCUBATION TESTS**

- 2.9.1 It should be emphasized that incubation tests are no substitute for proper control of seam integrity, heat processing and hygienic cooling and handling. However, samples of heat processed cans should be subjected to a satisfactory official incubation tests and any cans showing evidence of gas formation should be subjected to laboratory examination including seam evaluation and microbiology.
- 2.9.2 The incubation and microbiological tests should be carried out under the control of inspection service. Appropriate action should be taken by the inspection service if unsatisfactory results are found.

## **14 SECTION B – SPECIAL CONDITIONS APPLICABLE TO GLASS JARS AND FLEXIBLE POUCHES**

### **1 GENERAL**

- 1.1 Since there is a wide range of materials, finishes and components for both glass jars and flexible pouches, it is not possible to lay down specific criteria for empty containers. However, the following general criteria should be met.
- 1.2 All components should be supplied to an agreed manufacturer's specification and components and empty containers should be checked regularly to ensure they comply with these specification. Component/container manufactures should also provide appropriate test procedures to be used by the packer.
- 1.3 Glass jars should be inspected to ensure absence of glass fragments or splinters, absence of glass defects and correct neck finish and dimension.
- 1.4 At all times prior to filling, empty containers must be stored and handled with due care so as to prevent their becoming contaminated or damaged.
- 1.5 Glass jars should be mechanically cleaned prior to filling to ensure removal of dirt and any glass fragment or splinters. This may be achieved by inversion and cleaning by water or air blast, or by suction.

### **2 FILLING/CLOSING**

- 2.1 Precise specifications for filling/closing conditions vary between different containers/components and it is therefore important to follow manufacturer's instructions. The following general points should be observed.
- 2.2 It is essential to ensure a close hermetic seal between glass jar and cap. An important factor in achieving this is the vacuum achieved within the jar which should be closely controlled and monitored.
- 2.3 It is important to achieve standardisation of fill-weight and/or head space otherwise uncontrolled variation in filled pouch thickness may occur which can adversely affect heat penetration.
- 2.4 To ensure adequate heat sealing of flexible pouches it is important that seals areas are not contaminated by product since this will increase the difficulty of obtaining satisfactory seals. Removal of air from flexible pouches prior to sealing should not result in product contamination of seal areas. It is not always possible to eliminate completely some liquid contamination but providing this is squeezed away during the heat sealing operation, satisfactory heat seals can be obtained.

### **3 PROSSESING**

- 3.1 The requirements for process lethality are identical for cans, glass jars and flexible pouches (refer to Section 2.5). Critical factors are required to be monitored and controlled, although this may differ according to the container used. Since neither glass jar closures nor flexible pouches will themselves totally withstand internal pressures generated during retorting, it is necessary to apply an overpressure during the heat process to balance the initial pressure generated. This overpressure is provided by the introduction of compressed air to the retort during processing and at least initial cooling.
- 3.2 Excess air, low vacuum or insufficient overpressure during retorting can cause glass jars lids to back-off during the process thus preventing eventual establishment of an hermetic seal. These parameters should therefore be monitored and controlled
- 3.3 Water is commonly used as the heat transfer medium when processing glass jars of flexible pouches. The water is steam heated and overpressure achieved by compressed air. The retort must have some form of water level indicator and the water should always be at least 6" above the top layer of containers throughout the process cycle.
- 3.4 Flexible pouches may also be heated by steam-air mixtures which provide both heating medium and overpressure. In such a system it is essential to ensure adequate mixing of steam and air at retort temperature. Sufficient checks on filled retorts should be carried out to ensure even temperature distribution is being obtained throughout the retort.
- 3.5 The scheduled process for flexible pouches must specify a maximum pouch thickness which can be maintained by retort overpressure and if appropriate mechanical restraint built into retort trays/baskets.
- 3.6 Special conditions applicable to canneries concerning hygiene, records and cook checks also apply. (Para 21-24)

### **4 POST PROCESS PROCEDURES**

- 4.1 Post process hygiene requirements (cooling water, drying, handling etc) applicable to cans are equally important for glass jars and flexible pouches. The following additional points should also be observed.
- 4.2 Glass jars should be 100% inspected post process for loss of vacuum. They should be manipulated carefully to avoid damage to glass or caps, especially displacements of caps. Caps should be dried as soon as possible to avoid external rusting, especially in the area round the jar rim.

Jars should not be handled manually until dry and cool.

- 4.3 Flexible pouches, even when dry, do not provide the same degree of barrier to ingress of micro-organisms as dry cans or jars. They must be treated differently and in addition to normal post process hygiene requirements the following conditions should also be observed:
- a. Processed pouches should be dried as quickly as possible.
  - b. Processed pouches should be handled mechanically.
  - c. Processed pouches should be individually overwrapped or carton-boxed as soon as possible after drying.

## **15 REGISTRATION OF ESTABLISHMENTS FOR MANUFACTURING MEAT PRODUCTS IN HERMETICALLY-SEALED MEAT PLANT**

Establishment for manufacturing meat products in hermetically-sealed meat plant shall be approved and registered by relevant authority of the country.

## **16. QUALITY ASSURANCE PROGRAMME**

The quality assurance programme shall be implemented, managed, maintained and reviewed regularly by the management.

### **16.1 Manuals**

The establishment shall have operating manuals which at least described the following elements:

- 16.1.1 Commitment by Management
- 16.1.2 Food Safety Objectives
- 16.1.3 Management structure and responsibilities
- 16.1.4 Quality assurance manuals

#### **16.1.1 Commitment by management**

Shall be in the form of:

- a) Quality policy authorized at highest level.
- b) The statement shall give the quality aims and the authority to follow procedures stated in manual.
- c) The policy statement shall be displayed at strategic locations throughout the establishment.

### **16.1.2 Food Safety Objectives**

To ensure foods of animal origin are safe and wholesome for consumers.

### **16.1.3 Management structure and responsibilities:**

- a) Organization chart particularly the senior management, production and quality personnel
- b) Responsibilities for quality checks, monitoring and corrective action
- c) Job description for each personnel

### **16.1.4 Quality assurance manuals**

Shall describe the following elements:

- i. Product Description
- ii. Each product shall be described clearly of raw material such as:
  - Specifications of live birds /animals required or to be slaughter
  - List of suppliers
  - Agreement on quality with supplier of live birds/animals.
  - Inspection and test method for each specification.
- iii. Process control for each product
  - Layout plan of each establishment
  - Flow charts for each process
  - Describe procedures in each process
  - Laying standard for product at each stage
  - Identify parameter for each process and ensure compliance to standard
- iv. Hygiene and sanitation
  - Swab test and sample
  - Cleaning and sanitation procedures
  - Pest control
  - Waste disposal procedures
  - Storage of dangerous substance
  - Controls of personnel
- v. Finished product control
  - Standard for finish product
  - Sampling and testing
  - Product/batch coding system
  - Storage control procedures
  - Product release system
  - Product recall system

- vi. Document and data control
  - Veterinarian officials have authorized to call for document and data control at all time.
    - Authorization on release of document and data
    - Control on distribution of document and data
    - Amendment of system and procedures
- vii. Equipment and Maintenance
  - Guideline on use of equipment installation and maintenance
  - Documentation and records (log sheets, production charts, etc)
  - product/batch code system
  - Type of equipment being used to monitor the process, such as thermometers, gauges, etc and procedures and responsibilities for the testing and calibration of these instruments.
- viii. Documentation and Record
  - Forms recording and log sheets shall be mentioned in the manual.
    - This section shall also contain a summary table of all forms included.
- ix. Internal Review and Audit
  - Procedures for review and auditing of the quality system internally.
- x. Monitoring procedures and corrective action
- xi. Training of Personnel
  - Increase knowledge and skill of personnel at all level
  - Training on quality improvement

## **17. HACCP PLAN AND IMPLEMENTATION**

The plant shall have effective HACCP System in place and operational before consideration for accreditation. HACCP plan shall be in accordance with the Codex Guidelines for the Application of the Hazard Analysis Critical Control Point (HACCP) System. The HACCP shall be implemented, managed and maintained and reviewed regularly by the establishment. The HACCP system has to be certified by relevant authority/ agency.

## **18. STAFF COMPETENCE**

- a) Key personnel such as Plant Manager, Quality Assurance Officers, and Floor Supervisors shall be qualified and trained in GMP, quality

assurance and HACCP system.

- b) All other personnel shall be adequately trained for the functions they perform.

## **19. MICROBIOLOGICAL AND OTHER CONTAMINATION MONITORING**

Where microbiological, chemical or physical specifications are used in the meat product control system, such specifications shall be based on sound scientific principles and state where appropriate, monitoring procedures, analytical methods and action limits.

## **20. PRODUCT IDENTIFICATION**

Product identification and trace back mechanisms:

- i. Labeling shall cover at least product description, Est. No. and production date
- ii. The establishment shall have an effective system to trace back the finished products to origin of meat as raw material in the meat processing.

## **21. SPECIFIC REQUIREMENTS BY MEMBER STATES**

Notwithstanding the above criteria, any member states **may** have the right to **include** additional conditions.

Hermetically-sealed containers include cans, glass jars, flexible pouches and any container which is designed and intended to protect the contents against the entry of micro-organisms both during and after heat processing.