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SAVING LIVES
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Food Safety and Quality Assurance Unit

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Technical Expectations – Manufacturing of Canned food

Purpose

The purpose of this document is to establish the requirements WFP expects from manufacturers of canned food to meet.
Conditions in this document are used for audit purposes and technical assessment. Not complying with these requirements may generate critical, major or minor observations and / or suspension of the supplier.
The food supplier is responsible for setting up the production process and for the quality produced.

Requirements

1. ***Manufacturing Standards and Quality Management Certification***
   The appropriate standards to refer to for raw materials, ingredients, packaging and the finished product are included in the finished product technical specification.

   As of 01.06.2021 all canned food purchased internationally must be produced in a facility that has FSSC22000 certificate or equivalent GFSI (IFS/BRC). Not complying with this request may result in the suspension of the supplier from WFP's roster.

2. ***Manufacturing site***
   The manufacturer shall upon request forward a copy of the Manufacturing License for the products issued by its National Regulatory Authority.

3. ***Compliance with WFP specifications and contract conditions***
   Supplier has to incorporate all requirements of WFP specifications and contract conditions in its QM system. Supplier should have a qualified can seam technologist on site for all can seam tear downs / assessments (this can be a suitably trained operator). The engineering team / machine setters should also be qualified in can seam technology.

4. ***Pre-requisite programmes and HACCP:***
   The manufacturer shall have a verified HACCP Plan that includes pre-requisite programs (PRPs) as per ISO/TS22002-1 and Codex general principles of food hygiene.

   Among others, the manufacturer must ensure effective implementation of following PRPs
   - Construction and layout of buildings
   - Equipment suitability, cleaning and maintenance
   - Management of purchased materials
   - Cleaning and sanitizing
   - Product recall procedures

   HACCP plan should include (among other risks):
   - Heavy metals and tin
   - Nitrates/nitrites, BHT/BHA and other additives in case of meat/chicken cans
   - Risk of toxic seeds contamination – for canned pulses and hummus

- Radionuclide content for canned food coming from Japan
- Histamine – for fish
- Antibiotics and veterinary residues – for meat/chicken cans
- Pesticides – for canned vegetables and pulses
- Can closure – both from supplier (3 piece can) and at filling
- Quality of cooling water (e.g. chlorination)
- Storage of cans in tropical conditions (>40°C)
- Foreign matter in general and bone pieces coming from meat/mechanically de-boned meat
- For canned tomatoes pH should be stated either as a CCP or OPRP

The manufacturer shall have a subject matter expert which can demonstrate comprehension of:

- F0 value principle and factors affecting the F0 value.
    - For canned tomato, F0 is not required, however an expert with knowledge of pasteurization and decimal reduction time is required.
- Double seam, hermeticity and related controls

5. ***Quality Control:***
    - Periodical analyses of water used in contact with food, hygiene and cooling phase of the sterilization. Analyses of water should include microbiological parameters and heavy metals. This should include all product process water e.g. for can rinsing / retort use – include turbidity as sediment / chemicals in water can affect rust resistance of can over life (especially in the nook of the can seam). Amount of biocide in the cooling water (e.g. chlorine). If water is re-used, they need to control BoD/CoD.
    - Periodical analyses for contaminants should be performed on final product

    Analyses shall be performed as per QC Plan.

6. ***Equipment and production requirements***

    Manufacturer shall have:
    - Horizontal autoclaves with automated pressure control, cooling system and data logging. Must be compatible and validated for the specific product
    - Temperature probes that can be positioned inside of the cans for process validation
    - Camera for inspection of the double seam (caliper and micrometer are also acceptable but not preferred)
    - Pressure test equipment
    - Vacuum test (right after seaming, full or empty can, depending on the headspace)
    - Laboratory equipment for determination TPC
    - Temperature controlled room for storage of meat (meat cans/fish cans)
    - Ink jet printer, for printing traceability information on the cans.
    - A can blower or inverters shall be used before filling to remove potential foreign matters.

7. ***Quality Management and practices***
    - Validation of the sterilization process for specific product and packaging, including measurements in the coldest part of the can in the coldest part of the autoclave with F0 value calculations.
        - Thermometer should have 0.2-degree accuracy
        - Verification of the sterilization should be done monthly, checking heating and cooling time (lag not more than 10 minutes)
        - Incubation studies shall be conducted for thermophiles (at each change of the recipe and/or types of raw materials used)

- For canned tomato, the thermal treatment shall be validated to ensure 5 log reduction of vegetative pathogens and destruction of spoilage microbes and enzymes is achieved.

- Following SOP should be available:
  - SOP for supplier management and approval (raw materials, cans and lids). As of 01.06.2021 packaging supplier for cans and lids will need to have FSSC22000 certificate.
  - Calibration Plan for measuring equipment, including CCP thermometers
  - SOP for sterilization (time, temperature, pressure)
  - SOP for inspection of the double seam
  - SOP for storage of meat/fish (for meat/fish/chicken meat cans)
  - SOP for product recall
  - SOP for management of non-conforming products
  - Compliant management SOP
- Each batch shall be released only after clearance by the internal laboratory and quality assurance practices.
- Rework: Allowed up to the sterilization process, based on risk analysis. Clear SOP & documentation required.
- Recycle/Reprocess: No recycling or reprocessing of finished product/end product

8. *Packaging*

8.1 General requirements

- All materials in direct contact with food products (packaging materials, lacquer) must be food grade and compliant with :
  - The last version of the EU law Regulation (EC) No 1935/2004 regarding food contact
  - AND/OR the last version of the FDA law Regulation included in the 21 CFR regarding food contact

WFP must be consulted if certificate of compliance for food contact material is provided against a local regulation.

- Can should be received inverted as a mean to prevent foreign matter contamination.

- The design of the packing equipment should be done to avoid damages on the cans.
  - Design equipment to allow an even, continuous flow of containers with no sharp edged to avoid scraping of the cans. Any length of conveyor where cans are inverted should be plastic belt and transfers to avoid damage.
  - Cans are not dropped onto conveyors or other pieces of equipment
  - Line speeds are synchronized to avoid excessive starts and stops, high line pressure or allowing packages to pile up

- Every packaging item (cans, carton boxes…) must have a shelf life that is recommended by the packaging supplier. Similarly, clear definition of storage conditions to preserve packaging integrity

and properties before productions should be provided by packaging supplier and applied by food manufacturer in its premises. Shelf life of packaging and storage conditions must be reflected in raw material packaging specifications available at food manufacturer premises.

- Head space
  - The headspace must be optimized considering the impact that it can have on the mechanical proprieties of the can, the vacuum process, seam tightness.
  - It is important to note that:
    - Having sufficient headspace is important to achieve a vacuum in the can
    - Too little headspace increases the risk of swells and or buckled ends/ bottoms. Also increases the risk of loss of hermetic seam due to seam contamination.
    - Too much headspace may result in slack fills or panelled can sides.
    - Enough headspace and vacuum are needed to allow product to be shipped to a high-altitude market (HAM) if necessary, without exhibiting swelling.

- Tin plate and lacquers
  - Internal and external can coating weights need to be set by the coating supplier working with the can / end manufacturer. Internal coating composition and grammage must be selected based on the food content requirement.
  - Anytime an internal lacquer is changed, accelerated shelf-life testing should be performed and it should be verified for appropriate.
  - Anytime the thickness of the tin plate is changed, accelerated shelf-life testing should be performed and it should be verified for appropriate.
  - A proper validation of suitability of lid and can must be performed before production in order to ensure compatibility.

8.2 Quality controls

A) Incoming quality controls

The manufacturing facility shall have an incoming goods sampling program for empty cans and lids and cartons. Specifications for can bodies and ends must be on file and specific to the can supplier. They shall include details of can dimensions, end profile, end hook, can body weight, can body and end thickness, side seam weld, empty can water capacity, external and internal lacquers (coatings), seam dimensions of the sealed end.

The vertical seal should be inspected for integrity (magnifying glass or lens) and any signs of separation. Lacquer coverage over the vertical seal should be checked too and be adequate, not excessive to ensure an appropriate seal without risk for transfer on to product.

Similarly, the cartons must be visually inspected, and the certificate of analysis must be checked for compliance with WFP requirements (e.g. ECT)

Refer to WFP packaging specification for further details and guidance on requirements.

It may occur that seam trim is still present in the can therefore cans must be checked and seam trim removed.

B) Online quality controls

- Seam dimensions[1]

The seam dimensions must specify acceptable range or limits for parameters, such as seam thickness, seam length, end hook, cover hook, body hook, countersink, and tightness rating. Body hook butting and actual overlap tightness as well as those such as vacuum, pressure ridge and wrinkle (pleat), that could indicate potential can defects from the seaming operation must also be specified. During production, the manufacturing facility shall ensure that seamers are operated to match the can properties and obtain a vacuum to maintain a hermetic seal.
The ollowing analysis should be done at start of production and then at minimum 2h intervals as a minimum with at least 3 cans. [2]
per seaming head sampled each time:

- Double seam dimensions (at 3 different points per can)[3]
- Check the vertical seam and the bottom seam post filling operation
- Can integrity (recommended pressure test on empty cans) or CoA from can suppliers
- Tightness

The last five good cans filled should be visually assessed and recorded.
Prior to initiating the production, following shut down or turn over, there should be check of first seam operation and second seam operation.

A tightness from 70% to 95% should be achieved (= wrinkles rating) with consideration that certain compounds will be expected to achieve higher values (e.g. 100% for aluminum).

- Visual inspection

Visual examinations (external observation) must be done at greater frequencies (every 30min) and must be done for the entire container (including double seam, welded side seam).
Guidance to perform visual examinations:[4]
Run thumb and forefinger around seam on inside (chuck wall) and outside of seam to locate any roughness, unevenness, or sharpness. Examine by sight and touch for the following defects that may result in can leakage:

- sharp seam
- cutovers or cut-throughs
- false seam (although some false seams may not be detected by external examination)

[1] Supporting tool: https://docs.wfp.org/api/documents/WFP-0000156039/download/
[2] A tool to perform the measurement of the double seam can be provided by WFP upon request.
[3] WFP recommends the use of micro-camera (seam scan equipment). Must be calibrated in humidity conditions it is used in. Alternatively, manufacturers can use only caliper (seam teardown) and pressure test.
[4] BAM Chapter 22A: Examination of Metal Containers for Integrity | FDA

- dents
- deadheads (incomplete seam)
- excessive droop
- knocked-down flange
- cable cuts on double seam
- pleats / wrinkles

Both visual examinations and seam measurement (=tightness) are mandatory to evaluate the quality of the double seam.

- Daily statistics should be kept on percentage of defects, with categorizing defects in to 3 categories:[5]
    - Critical
        - there is, or has been, microbial growth in the container contents; or
        - the hermetic seal of the container has been either lost or seriously compromised; or
        - the container is unsuitable for distribution and sale
    - major (defects that can potentially cause loss of hermeticity - (e.g. large dents)
    - minor (defects that cannot cause loss of hermeticity – e.g. small dents)

For canned tomatoes pH should be measured at east each hour as OPRP or CCP.

9. *Lot definition + Coding/Labelling + Traceability*

- Lot size limitation – for shipping documents

Production Capacity	Batch Size
0-500 MT/day	1 day of production
> 500 MT/day	1 shift (8 hours) of production

- Marking on the product shall facilitate traceability at least up to the level specified above (day or a shift). It is preferred that the of production date is printed on the can as well.

Highly recommended: Inks used for coding (batch number, PD, BBE) to be thermos sensitive inks.

10. *Documents to be shared after the first delivery to WFP*

- Status on the CAPA implementation
- Critical Control Points (CCP) Monitoring records

Timeline – Above documents to be submitted within 21 calendar days of completion of production

[5] Guidance provided under the following document: https://docs.wfp.org/api/documents/WFP-0000156041/download/