



World Food Programme

Technical Specifications for CANNED SARDINE

Commodity Code: **FSHCFI020**

Version: **2, adopted in 2020**

Replacing: **Version 1.0, adopted in 2018**

Date of Issue: **07 July 2020**

This version replaces the version 1.0 adopted in 2018

The adjustments are:

- Heat treatment must be adequate for storage under tropical conditions*
- Maximum cadmium level and number of fishes*

1. SCOPE

This specification applies to **Canned Sardines** distributed by WFP, hermetically sealed and processed by heat to achieve commercial sterility and prevent spoilage. The fish will be packed in 200g or 425g cans, in a medium as specified by contract (e.g. tomato sauce/vegetable oil/brine).

2. RAW MATERIALS

2.1 Sardine

Canned fish shall be manufactured from fresh or frozen fish of a quality fit for human consumption. No fish that are affected by biotoxins from the aquatic environment or have high histamine levels may be used for canning. The following species can be used in sardine canning:

- *Sardina pilchardus*
- *Sardinops melanostictus*, *S. neopilchardus*, *S. ocellatus*, *S. sagax*, *S. caeruleus*,
- *Sardinella aurita*, *S. brasiliensis*, *S. maderensis*, *S. longiceps*, *S. gibbosa*
- *Clupea harengus*
- *Clupea bentincki*
- *Sprattus sprattus*
- *Hyperlophus vittatus*
- *Nematalosa vlaminghi*
- *Etrumeus teres*
- *Ethmidium maculatum*
- *Engraulis anchoita*, *E. mordax*, *E. ringens*
- *Opisthonema oglinum*

2.2 Vegetable oil and fat

Vegetable oil, if used in pre-cooking fish or as an ingredient, should conform to:

- Codex Standard for Named Vegetable Oils (CODEX STAN 210-1999);
- Codex Standard for Olive Oils and Olive Pomace Oils (CODEX STAN 33-1981);
- Codex Standard for Fats and Oils not Covered by Individual Standards (CODEX STAN 19-1981).

2.3 Tomato and tomato sauce

Tomato used in manufacturing tomato sauce shall conform to Codex Standard for Tomatoes (CODEX STAN 293-2008) or Codex Standard for Preserved Tomatoes (CODEX STAN 13-1981).

Tomato sauce used as a medium for filling shall be manufactured in accordance with Codex Standard for Tomatoes (CODEX STAN 293-2008).

2.4 Other ingredients and food additives

All other ingredients and food additives used for canning shall be of food grade quality and conform to all applicable Codex standards.

3. PROCESSING

Canned Sardine shall be manufactured in accordance with (latest versions):

- Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003);
- Codex Standard for Canned Finfish (CODEX STAN 119 - 1981);
- Recommended International Code of Practice for Canned Fish (CAC/RCP 10-1976);
- Recommended International Code of Hygienic Practice for Low-Acid and Acidified Low-Acid Canned Foods (CAC/RCP 23-1979);
- Recommended International Code of Practice: General Principles of Food Hygiene, CAC/RCP 1-1969 "Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its application".

For compliance with Codex standards, the processor must be able to demonstrate by principle and practice the adoption, implementation and recording of:

- Good Manufacturing Practices
- Hazard Analysis Critical Control Point program

In this context an appointed WFP Inspector / Quality Surveyor is entitled to visit the factory without prior notice during any period when WFP product is being manufactured to check that the GMP and HACCP systems are in place. The Inspector / Quality Surveyor may request to see:

- **Records** (i.e. names of people in charge of the process and quality control, temperatures and other details of the thermal process establishment, retort records, visual inspection and teardown for empty and seamed cans, incoming inspection of empty cans, cooling water chlorination, Cook-Chex monitoring records, swab test results, etc).
- **Procedures** (e.g. SSOPs such as cleaning, personnel hygiene and their verification; HACCP; sampling and analysis protocols for raw material and finished products, decomposition controls, retorting by-pass controls, etc).
- **Instructions** (e.g. process instructions, cleaning instructions, testing instructions).
- The **SSOPs, HACCP Plan and Quality Manual** for the process or factory.

The producer must be **registered under national food law** as a processor of foods for human consumption. In addition, the producer must have a **legal authorization** to produce this commodity in the country where the factory is located and the country where the product will be exported (e.g. **FCE- Food Canning Establishment- and SSID- Process Filing- numbers in the USA or equivalent**).

4. PRODUCT SPECIFICATIONS

4.1. General requirements

Net weight: 200 or 425grams (will be specified in the tender document and contract).

Drained weight: Min. 60% of net weight.

Number of fish (*headed, gutted, viscera, tail and fins are removed*):

- 1-20 pieces* for 200g cans
- 3-20 pieces* for 425g cans

Odour, flavour and texture: Canned sardine shall have an odour, flavour and texture characteristic of the sardine genus and the tomato sauce used as fill medium and shall not contain any objectionable odour, flavour and texture of any kind.

** number of pieces shall be adjusted to obtain an appropriate headspace during filling*

4.2. Thermal process establishment

The manufacturing facility shall establish the thermal processes used to assure commercial sterility of its canned products through scientific validation studies. Thermal process establishment must consist of two parts: 1) temperature distribution studies specific to the process lines and retort systems used; and 2) heat penetration studies specific to the product form, fill medium, ingredients and can size. The results for such studies must determine how the **minimum Fo value to achieve commercial sterility** is achieved when the operating parameters for the facility's cook schedules are followed. The studies shall also determine the critical factors for the thermal process, provide alternative process schedules, document the retort configuration and instrumentation, determine vent schedules and cooling protocols. Retort records must provide proof that these are monitored and complied. Such records shall be reviewed by a trained individual within 24 hours of the completion of the cook. Thermal processes must be established prior to use and validated at a frequency that reflects any changes that may impact the safety of the process or product. In the absence of such validation triggers, thermal process validation may be done annually or once every two years.

The cans should be shelf stable even when stored under tropical conditions (>40 °C). Risk of thermophilic spoilage should be adequately managed by the producer (e.g. appropriate thermal treatment, raw material controls, stability studies).

4.3. Hygiene

4.3.1 The final product shall be free from any foreign material that poses a threat to human health.

4.3.2 When tested by appropriate methods of sampling and examination prescribed by the Codex Alimentarius Commission, the product:

- shall be free from micro-organisms capable of development under tropical conditions of storage (>40 °C);
- Maximum levels of histamine in individual samples/units must meet Codex requirements
- shall not contain any other substance including substances derived from microorganisms in amounts which may represent a hazard to health in accordance with standards established by the Codex Alimentarius Commission;
- shall be free from container integrity defects which may compromise the hermetic seal.

4.4. Chemical contaminants and toxins

Contaminants and toxins in the **Canned Sardine** could come from the fish itself, the fishing grounds, from ingredients, equipment, utensils and even from the cans. These shall not exceed the levels or country-specific regulatory requirements, whichever is stricter.

Canned Sardine shall not contain pesticide residues in amounts which may represent a hazard to health. In some markets, there are chemical requirements about can lacquers.

4.5 Hermetic seal

The manufacturing facility shall have an incoming goods sampling program for empty cans and lids. 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, 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 seam dimensions must specify acceptable range or limits for parameters, such as seam thickness, seam length, body hook and cover hook, needed to calculate overlap as well as those, such as vacuum, countersink, wrinkle, that could indicate potential can defects from the seaming operation.

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. Checks for defects in seamed finished product cans shall be done visually at a minimum of every 30 minutes. In addition, seam teardowns must be carried out at minimum every four hours, using either a micrometer or a seam projector. All seaming records are considered legal documents and therefore, must be recorded accurately and reviewed within 24 hours of production.

4.6. Shelf life

It shall retain normal product qualities for at least **three years** from the date of manufacture when stored under tropical conditions of storage (>40 °C). Thermal processing, seaming and other HACCP records shall be kept for a minimum of shelf-life plus one year.

5. PACKAGING

Canned Sardine can be packaged into 200g or 425g tin can to constitute the primary packaging. The secondary packaging is cartons to facilitate transportation and storage.

5.1. Tin can

The metal containers (tins) must coated internally and externally with lacquers appropriate for the product. Specifications and guarantees for the material, lacquers and other treatments used shall be available. Likewise, the facility must obtain the acceptable ranges and limits for the double seam dimensions and other characteristics of the filled can specific to the can type, size and supplier. Together with fill standards required for the product, these specifications will be used to ensure the finished product is hermetically sealed during the seaming operation.

Some guidelines is showed in table 1.

Table 1: Specification for tin can

	Can size	
	200g	425g
Can size	74.1 x 59.0 mm	115.0 x 75.0 mm
Can weight	29.9g	59.0g
Internal tin coating mass	8.4- 11.2g/m ²	
External tin coating mass	2.8- 11.2g/m ²	
Lid type	regular or easy open	

5.2. Cartons

Cartons should be new, strong cardboard cartons containing 50 tin cans of 200g or 24 tin cans of 425g, manufactured from well-constructed single wall, fluted paper, corrugated board with a specific weight of approximately 750g per square meter. This specific weight corresponds to a carton weight of approximately 560g.

- Cartons should have burst strength (edge crush test) of approximately 44 pounds per square inch or 3.2 kg/ cm² or equivalent.
- Carton sides and flaps should be glued, not stapled or strapped.
- Substance of cartons 275-120-275 (750g per m²).

Slip sheets or plywood should be placed inside each container at every three layer of cartons to provide the required stacking strength. Pallets with appropriate stacking configuration could also be used.

6. MARKING

6.1. On tin cans

The following information should be available on tins:

- Name of the product
- Net weight
- Name of manufacturing facility (including country of origin)
- Batch number (should be traceable to retort and seamer used for manufacturing)
- Production date (and shift, if there is more than one shift)
- Best before date / Expiry date
- Additional marking as per contractual agreement

6.2. On cartons

The following information should be available on each carton:

- Name of the product
- Number of tins per carton
- Net weight
- Name and address of the supplier (including country of origin)
- Production date
- Expiry date
- Additional marking as per contractual agreement

7. STORING

Canned Sardine must be stored under cool, dry and hygienic conditions.

8. INSTRUCTION FOR USE

Consume all contents once opened.

9. ANALYTICAL REQUIREMENTS

The principal tests in table 2 must be performed in order to check if the quality of the **Canned Sardine** meets above requirements. Additional analyses shall be defined in case of further quality assessment is required.

Table 2: Limit of compulsory tests and reference method

No	Tests	Requirements		Reference method (or equivalent; Latest version)
		200g cans	425g cans	
1.	Number of fish (<i>headed, gutted, viscera, tail and fins are removed</i>)	1-20 pieces	3-20 pieces	Visual inspection
2.	Net weight	200g	425g	CODEX 119 - 1981, Rev.1-1995
3.	Drained weight (60% of net weight)	Min. 120g	Min. 255g	CODEX 119 - 1981, Rev.1-1995
4.	Can size and weight	74.1 x 59.0 mm; 29.9g	115.0 x 75.0 mm; 59.0 g	Can manufacturer specifications
5.	Fish species	<i>Sardina pilchardus</i> <i>Sardinops melanostictus</i> , <i>S. neopilchardus</i> , <i>S. ocellatus</i> , <i>S. sagax</i> , <i>S. caeruleus</i> , <i>Sardinella aurita</i> , <i>S. brasiliensis</i> , <i>S. maderensis</i> , <i>S. longiceps</i> , <i>S. gibbosa</i> <i>Clupea harengus</i> <i>Clupea bentincki</i> <i>Sprattus sprattus</i> <i>Hyperlophus vittatus</i> <i>Nematalosa vlaminghi</i> <i>Etrumeus teres</i> <i>Ethmidium maculatum</i> <i>Engraulis anchoita</i> , <i>E. mordax</i> , <i>E. ringens</i> <i>Opisthonema oglinum</i>		Visual inspection
6.	Organoleptic (texture, color, smell, taste)	Characteristic of fresh fish and good quality fill medium		CAC-GL31-1999
7.	Clostridium botulinum	0 cfu/g		AOAC 977.26
8.	Mercury (Hg)	Max. 0.5ppm		AOAC 977.15
9.	Cadmium (Cd)	Max. 0.1ppm		AOAC 945.58
10.	Lead (Pb)	Max. 0.5ppm		AOAC 972.23
11.	Inorganic Arsenic (As)	Max. 1.0ppm		AOAC 986.15
12.	Tin (Sn)	Max. 200ppm		AOAC 985.16
13.	Para red	Absent		HPLC or LC-MS/MS
14.	Rhodamine	Absent		HPLC or LC-MS/MS
15.	Sudan red dyes (I, II, III and IV)	Absent		HPLC or LC-MS/MS
16.	Histamine	Max. 10 mg/100 g <i>Maximum levels of histamine in individual samples/units must meet Codex requirements</i>		AOAC977.13