



Technical Specifications for the manufacture of:

FORTIFIED NIXTAMALIZED MAIZE FLOUR – HONDURAS AND RBP

- Local¹
- Regional

Commodity code: **CERMML030**

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This is the 1st version of specification.

1. SCOPE

This specification applies to **Fortified Nixtamalized Maize Flour** (hereafter called the product) for human consumption prepared by nixtamalization (Lime cooking or Alkaline cooking) of common maize, *Zea mays* L. that WFP purchases and /or distributes to beneficiaries. The product is suitable for Tortillas making.

2. REFERENCES

Unless otherwise specified in, the product must comply with the following guidelines or standards (latest versions):

- Recommended International Code of Practice: General Principles of Food Hygiene CAC/RCP 1-1969, Rev. 4 - 2003 including Annex “Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its application”.
- General principles for addition of essential nutrients to foods: CAC/GL 09-1987
- Recommendations on Wheat and Maize Flour Fortification. Meeting Report: Interim Consensus Statement, WHO, 2009.
- General standard for contaminants and toxins in food and feed: CODEX STAN 193- 1995.
- Maize in human consumption, FAO, 1992.
- Harina De Maíz Nixtamalizado, Norma Mexicana NMX-F-046-S-1980

3. RAW MATERIALS

3.1 Main ingredients

The product covered by the provision of this specification shall be manufactured from fresh maize grain of good quality, free from foreign materials, substances hazardous to health, excessive moisture, insect damage and fungal contamination and shall comply with all relevant national food laws and standards. Specific requirements for the maize are:

- Conform to Codex STAN 153-1985.

¹ Local specification is to be used when procurement and distribution is done within Honduras. Regional specification is to be used when product is bought in one country and distributed in another country. Regional specification has lower moisture level.

- Be tested for aflatoxin.
- Be obtained from non-genetically modified varieties (*if required by the contract*).

Maize must be stored under dry, ventilated and hygienic conditions. Only authorized insecticides (e.g. phosphine) may be used for fumigation control. Where needed, fumigation must be performed by certified operators.

3.2 Vitamins and minerals

Complete micronutrient premixes (vitamins and minerals) must be purchased from GAIN Premix Facility or any of the GAIN approved suppliers. A complete list is available at the following link: <http://gpf.gainhealth.org/suppliers/current-suppliers>

Micronutrient premixes must be delivered to the processor of the product with a complete Certificate of Analysis as well as with a Proof of purchase of premixes. The two documents must be presented with other documents for payment.

Micronutrient premixes must be stored in a dry, cool and clean place.

4. PROCESSING

4.1 Formula

The product covered by the provision of this specification is manufactured according to the formula showed at table 1.

Table 1: Product formula

Nº	Ingredients	Percentage (<i>by weight</i>)
1	Maize flour	99.975
2	Vitamins/Minerals	0.025

4.2 Method of processing

The product covered by the provision of this specification shall be processed by nixtamalization (or lime-cooking as per described in FAO publication “Maize in human consumption”, 1992) then followed by a grinding process in which the grain is comminuted to a suitable degree of fineness.

4.3 Homogeneity of micronutrients

Theoretical calculations indicate that a mixing system with a Coefficient of Variation of 10% using iron as the indicator element, will enable product to meet the above variation target on 95%, provided that all conditions of mixing are rigorously applied. The guidelines for this calculations is shown at <http://foodqualityandsafety.wfp.org>.

4.4 Food safety and risk assessment at manufacturing premises

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

- Good Manufacturing Practice
- 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 of the process, mixing times / quantity, cleaning schedules, etc).
- Procedures (e.g. cleaning, personnel hygiene, HACCP, sampling and analysis).
- Instructions (e.g. process instructions, cleaning instructions).
- The quality manual for the process or factory.

The manufacturer must be registered under national food law as a processor of foods for human consumption.

5. PRODUCT SPECIFICATIONS

5.1 General requirements

5.1.1 Contaminants

5.1.1.1 Heavy metals

The product shall be free from heavy metals in amounts which may represent a hazard to health.

5.1.1.2 Pesticide residues

The product shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

The product shall be prepared with special care under good manufacturing practices, so that residues of those pesticides which may be required in the production, storage or processing of the raw materials or the finished food ingredient do not remain, or, if technically unavoidable, are reduced to the maximum extent possible.

These measures shall take into account the specific nature of the products concerned and the specific population group for which they are intended.

5.1.1.3 Mycotoxins

The product shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5.1.1.4 Other contaminants

The product shall be free from residues of hormones, antibiotics as determined by means of agreed methods of analysis and practically free from other contaminants, especially pharmacologically active substances.

5.1.2 Hygiene

5.1.2.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to these products.

5.1.2.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.1.2.3 When tested by appropriate methods of sampling and examination, the product:
– shall be free from micro-organisms in amounts which may represent a hazard to health;

- shall be free from parasites which may represent a hazard to health; and – shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

5.1.3 Fit for human consumption guarantee

Suppliers shall have to check the quality of their products and guarantee that the product covered by the provision of this specification is ‘fit for human consumption’.

5.2 Specific requirements

5.2.1 Fortification

The product covered by the provision of this specification must be fortified to provide the following net micro nutrient supplement per 100g of finished product specified in table 2.

Table 2: Micronutrient rate and chemical form

	Target	Chemical form
Vitamin A	1.0 mg/kg	Dry vitamin A palmitate 250 n.s
Vitamin B1	4.4 mg/kg	Thiamine mononitrate
Vitamin B2	2.6 mg/kg	Riboflavin
Vitamin B3	35.0 mg/kg	Nicotinamide
Folic acid	1.0 mg/kg	Folic acid
Vitamin B12	0.008 mg/kg	Cyancobalamin
Iron	15.0 mg/kg	NaFeEDTA
Zinc	30.0 mg/kg	Zinc oxide

Note: Variable levels of micronutrients naturally present in maize may lead variable of micronutrients in finished product.

5.2.2 Characteristics

The product covered by the provision of this specification must have uniform fine texture, a pleasant smell and palatable taste. The product must be suitable for Tortillas making.

The product must be free of insect (all stages, dead or live). The maize color must comply with the requirement specified in the contract.

The product must also comply with other requirements specified in table 3. The characteristics (quality, presentation, packaging, marking) of entire lot must be homogenous.

5.2.3 Shelf life

The product covered by the provision of this specification shall retain above qualities for at least 6 months from date of manufacture when stored dry at ambient temperatures prevalent in the country of destination.

6. PACKAGING

6.1 General requirements

The product covered by the provision of this specification must be packed in appropriate packaging which safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product. The packaging shall be made of substances which are safe and suitable for their intended use (food grade). The packaging should not impart any toxic substance or undesirable odour or flavour to the product.

6.1 Product net weight

- 25 kg net weight
- Average net weight of the batch should not be less than specified net weight
- Maximum allowed deviation of individual package is not more than +/- 1% of the net weight

6.2 Packaging requirements

The product must be packed in new polypropylene (PP) woven bags, fit for export and multiple handling. The outer polypropylene bags must have a heat cut mouth to prevent fibrillation and have sewn single folder bottom or heat sealed bottom.

Bag specifications:

- Woven PP bag:
 - Size: fit for the product volume and multiple harsh handling
 - Food grade materials compliant with national regulations in the country of production
 - Density: minimum 90 grams per square meter (gsm) – average bag weight of the batch should not be less than specified minimum weight
 - Bags made of woven PP are to be given special food grade “ultraviolet” treatment that will sustain the whole product shelf life
 - Top and bottom folded one time and stitched with one line or heat sealed
- Second protective layer:

The bags must have a second protective layer either with an inner liner in PE (minimum 80 µm) or at least laminated with a minimum of 0.5 mm thickness.

Tests :

The bags of the product must pass the drop test (after each drop, there shall be no rupture or loss of contents) following the principles of the drop test standard (EN 277, ISO 7965-2, ASTM D5276 or equivalent) with following sequence:

- Butt dropping: Bag is dropped from a height of 1.20m on the bottom and the top of the bag.
- Flat dropping: Bag is dropped from a height of 1.60m twice on one flat face and twice on the opposite flat face.

Unless otherwise specified in the contract, two percent marked bags (included in the price) must be sent with the lot.

Note: For shipping containers, unless otherwise specified in the contract, kraft paper must be adhered to all internal sides, door, and floor of container. Kraft paper also need to be placed on the top of packaging. Desiccant needs to be placed/laid in container as appropriate location in order to absorb moisture. Supplier needs to use high quality desiccant and calculate the quantity of desiccant based on:

- *Efficiency of desiccant*
- *Length of time in transit in container*
- *Container capacity*

Supplier needs to provide in the offer the type of desiccant and quantity to be used for the consignment. If silica gel is used, 15 bags of at least 1 kg each must be placed in each 20 feet container.

7. MARKING

The labelling of the product covered by the provision of this specification shall comply with CODEX STAN 1-1985.

The following information should be available on bags:

- Name and logo of the product
- Net content
- Ingredients
- Name and address of the supplier (including country of origin)
- Production date
- Best before: end of mm/yyyy

Additional marking is as per contractual agreement.

8. STORING

The product covered by the provision this specification must be stored under dry, ventilated and hygienic conditions and far from all sources of contamination.

9. ANALYTICAL REQUIREMENTS – Local and Regional

Table 3: List of compulsory tests and reference methods

No	Tests	Requirements	Reference methods (or equivalent, Latest edition)
1	Organoleptic characteristics	Pleasant smell; Typical taste and colour	Organoleptic examination
2	Moisture content – Local Moisture content - Regional	MAX. 12.0 % (w/w) MAX. 10.0 % (w/w)	ISO 6540 AOAC 9450.46B
3	Crude fiber	MAX. 3.0 % (w/w)	ISO 5498 AOAC 962.09
4	Fat content	MIN. 1.5 % (w/w)	AOAC 954.02 ISO 11085:2008
5	Total ash	MAX. 1.7 g/100 g flour	ISO 2171 AOAC 942.05
6	Yeast and Mould	< 1,000 cfu/g flour	ICC No 146
7	Peroxide value	MAX. 10.0 meq/kg fat	AOAC 965.33
8	Total aflatoxin (B1+B2+G1+G2)	MAX. 20.0 ppb	AOAC 972.26
9	Granulation	MIN. 75 % (w/w) through 0.28 mm sieve	AACC 66-20
10	Vitamin A	MIN. 1 mg/kg flour	AOAC 992.04
11	Iron	15-55 mg/kg flour	AOAC 944.02
12	GMO (Only if required)	< 0.9 % of GMO material in total maize DNA	Quantitative PCR ISO 21570
13	Color of maize (Only if required)	As per contractual agreement	Visual examination