



Technical Specifications for FORTIFIED WHEAT FLOUR

Commodity code: **CERWHF010**

Version: **1, adopted 2019**

Replacing: **Version 4.1, dated 23 May 2011**

Date of **OSQC** issue: **08.11.2019**

The key changes are:

- 1. Revising wet gluten requirement*
- 2. Remove the alveograph test*

1. SCOPE

This specification applies to **Fortified Wheat Flour** (hereafter called the product) prepared from common wheat, *triticum aestivum* L., or club wheat, *triticum compactum* Host., or mixture of thereof, fortified with essential micronutrients for human consumption.

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
- General standard for contaminants and toxins in food and feed: CODEX STAN 193- 1995.
- Codex Standard for Wheat Flour: Codex Stand 152-1985, amendment: 2016, 2019

3. RAW MATERIALS

3.1 Wheat

The product prepared from wheat 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 wheat grains are:

- Conform to Codex STAN 199-1995
- Be obtained from non-genetically modified varieties (*if required by the contract*).

Wheat grains 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.

Wheat grains shall be free from the following toxic or noxious seeds in amounts which may represent a hazard to human health.

– *Crotalaria (Crotalaria spp.)*, *Corn cockle (Agrostemma githago L.)*, *Castor bean (Ricinus communis L.)*, *Jimson weed (Datura spp.)*, and other seeds that are commonly recognized as harmful to health.

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. Follow storage recommendations from the supplier of micronutrient premix in case labelled on shipped boxes and/or bags.

3.3 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 calculation is shown at <http://foodqualityandsafety.wfp.org/coefficient-of-variation-calculator>.

4. PRODUCT SPECIFICATIONS

4.1 General requirements

4.1.1 Wheat flour characteristics

Following shall be met in Fortified Wheat Flour:

- Shall be milled from fully mature, sound wheat grains, free from filth and impurities
- Shall be free from insects, its parts or its wiggler, parasites and rodents' excreta
- Shall be clean free from any foreign materials and substances hazardous to health
- Shall retain its natural properties and free from rancidity an unacceptable odour or taste
- Shall be homogeneous in colour and free from agglomeration
- Shall be suitable for bread making

4.1.2 Contaminants

Heavy metals

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

Pesticide residues

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

Mycotoxins

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

Other contaminants

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

4.1.3 Hygiene

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.

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

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.

4.1.4 Food Additives

Any food additive (if used) shall comply with Codex Standard on Food additives Codex stan 192-1995 and Codex Stand 152-1985.

4.1.5 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'.

4.2 Specific requirements

4.2.1 Fortification

The minimum levels of micronutrients for the fortification of wheat flour are indicated in below table 1. The incorporate rate is 250g micronutrient premix per ton of flour.

Table 1: Micronutrient rate and chemical form

Micronutrient	Target	Chemical form
Vitamin A	1.0 mg/kg	Dry vitamin A palmitate 250 CWS
Thiamine (vitamin B1)	4.4 mg/kg	Thiamine mononitrate
Riboflavin (vitamin B2)	2.6 mg/kg	Riboflavin
Niacin (Vitamin B3)	35 mg/kg	Nicotinamide
Folic Acid	1.0 mg/kg	Folic acid
Vitamin B12	0.008 mg/kg	Cyanocobalamin
Iron	15 mg/kg	NaFeNTDA
Zinc	30 mg/kg	Zinc Oxide

Note: Variable levels of micronutrients (i.e iron, zinc, etc.) naturally present in wheat may lead to variable amount of micronutrients in finished product.

4.2.2 Shelf life

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

5. PACKAGING

5.1 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.

Packaging materials must comply with the last amendments of national regulations in the country of production (if not existing: compliance with EU or FDA legislations requested). Bags must be new, uniform, strong, fit for export and multiple handling,

Note: Packaging requirement can also be agreed as per contractual requirements.

5.2 Product net weight

As per contract requirement,

- Average net weight of the batch should not be less than specified net weight,
- Weight and quantity tolerance must meet The International Organization of Legal Metrology International Recommendation OIML R 87¹.

5.3 Packaging requirements

As per contract requirement.

5.4 Compliance Tests:

The bags of finished 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 or equivalent) with following sequence (each bag should go through the butt dropping and flat dropping):

- 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 & 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.

5.5 Stuffing of Containers and other transport vehicles²

Use of desiccant is mandatory in each container to absorb moisture and condensation during shipment to preserve the product and packaging performance (exception made for sugar).

The following table provides a guideline on the quantity to be used;

Table 2: Guideline on the quantity to be used for calcium chloride-based desiccants:

Estimated days in container	20 ft container	40 ft container
15-59 days	9.00 kg	17.50 kg
60-89 days	11.25 kg	22.50 kg
90-120 days	13.50 kg	25.00 kg

Better alternative material can be used upon agreement with WFP.

In addition, and applicable to all bagged commodities, kraft paper should be laid to all sides of the container.

An optimum "breathing space" should be kept between top of cargo stow and container roof for bagged cargo. Recommendation is to keep between 15 to 20cm. Bags should be well maintained to avoid any movement.

Stuffing of containers with the product that is still warm from the process of milling is not allowed in order to avoid condensation and moisture transfer causing mould growth.

Empty containers/vehicles shall be clean, pest free and free of damage, odours and previous cargo remains. Ventilation holes must remain clear and unsealed.

¹ OIML R 78 Quantity of commodity in prepackages https://www.oiml.org/en/files/pdf_r/r087-e04.pdf, latest edition to be followed

² For more details, please refer to container loading procedure:

https://documents.wfp.org/stellent/groups/public/documents/manual_guide_proced/wfp254688.pdf

In case fumigation is required:

- It shall be done as specified in the GAFTA Standard for Fumigation³.
- Only phosphine gas can be employed during fumigation

6. 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 of Product: Fortified Wheat Flour
- Net content
- Name and address of the supplier (including country of origin)
- Batch number (or SI)
- Production date
- Best Before End: mm/yyyy

Additional marking is as per contractual agreement and conforms with Legislations of the Country in which the product is distributed.

7. STORING

The product covered by the provision this specification must be stored under dry, ventilated and hygienic conditions.

³https://www.gafta.com/write/MediaUploads/Trade%20Assurance/Gafta_Standard_for_Fumigation_WEB.PDF

8. ANALYTICAL REQUIREMENTS

As per contractual agreement, WFP will appoint an inspection company that will check that the food matches requirements specified in Table 3. Additional tests may be defined in case further quality assessment is required. The following analytical plans are currently utilized by WFP and shared only for suppliers' information. Suppliers should follow its own food safety and quality management plan. Additionally, WFP reserves the rights to change these plans at any time.

Table 3: List of compulsory tests and reference methods

No	Tests	Requirements	Reference methods (or equivalent validated methods)
1.	Organoleptic	Pleasant smell; typical taste and color	
2.	Moisture content	Max. 14.0 %, w/w	ISO 712/ICC no. 110 /1
3.	Total Ash	Max. 0.65 % of dry matter	AOAC 923.03 ISO 2171 / ICC method 104/1
4.	Protein	Min. 11.0 % of dry matter	ISO 20483/ICC 105/1
5.	Zeleny index	Min. 30 ml	ICC 116 & 118 ISO 5529
6.	Delayed sedimentation	Min. Zeleny value + 5 ml	
7.	Hagberg Falling Number (HFN)	Min. 230 seconds (incl. 60 sec preparation)	ICC 107 ISO 3093
8.	Wet gluten	Min. 26 %	AACC 38-12A ICC No 155 ISO 21415-1
9.	Gluten index	Min. 85 %	ICC 155 AACC 38-12
10.	Fat acidity	Max. 50 mg KOH per 100 grams dry matter	ISO 7305 AOAC 939.05
11.	Vitamin A	Min. 1.0 mg/kg of flour	AOAC 992.04 AACC 86-03.01
12.	Iron	Min. 15 mg/kg of flour	AOAC 944.02 AACC 40-41.03

Note: Other micronutrient tracers can be analysed instead of Vitamin A-Retinol and Iron, as per the minimum requirements stated in Table 3 for some exceptional cases.