



Technical Specifications for

HIGH ENERGY BISCUITS (HEB)

Commodity code: **MIXHEB000**

Version: **1.1, adopted 2019**

Replacing: **Version 16.0, 20/07/2016**

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The adjustments are:

-Harmonizing micronutrient requirements for general food distribution and school feeding

-Updating packaging requirements

1. INTRODUCTION

This specification applies to High Energy Biscuits purchased and/or distributed by WFP.

WFP High Energy Biscuits (hereafter called the product) are biscuits that are high in protein and supplemented with premix of vitamins and minerals. They are intended for school feeding and general food distribution.

2. REFERENCES

The product shall comply with the following guidelines and/or standards of the Codex Alimentarius.

- Recommended International Code of Practice: General Principles of Food Hygiene CAC/RCP 1-1969, including Annex "Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its application".
- Codex General principles for addition of essential nutrients to foods: CAC/GL 09-1987
- CODEX STAN 193-1995, Codex general standard for contaminants and toxins in food and feed.
- CODEX STAN 192-1995, Codex general standard for food additives.
- CODEX STAN 1-1985: General standard for the labelling of pre-packaged foods.

3. RAW MATERIALS

3.1 Main ingredients

The product shall be manufactured from fresh and good quality raw materials free from foreign materials, substances hazardous to health (including any contamination from toxic or noxious seeds), excessive moisture, insect damage and fungal contamination and shall comply with all relevant food safety and quality laws, regulations and standards for each material (if used) as followings:

- **Wheat flour** must conform to Codex STAN 152-1985.
- **Sugar** must conform to Codex STAN 212-1999.
- **Shortening** must be prepared from oil that conform to Codex STAN 210-1999, must be free from trans fatty acids and must contain only antioxidants that comply with Codex and relevant regulations: in case of using palm oi
- **Skimmed milk powder** must conform to Codex STAN 207-1999.
 - Maximum level aflatoxin M1: < 0.5 mcg/kg milk (recommended methods ISO 14501/IDF 171:20071 or ISO 14674/IDF 190:20052). Melamine Max. 2.5 mg/kg.

¹ Milk and milk powder: determination of aflatoxin M1 content, clean up by immunoaffinity chromatography and determination by HPLC.

² Milk and milk powder: determination of aflatoxin M1 content, clean up by immunoaffinity chromatography and determination by Thin Layer Chromatography.

3.2 Food Additives

- **Lecithin** shall be in proportion as specified in the Codex STAN 074-1981.
- **Raising agent** (i.e. SODA) must be added as specified in the codex STAN 074-1981, the maximal value is determined by the principles of GMP.
- **Flavouring** only permitted flavours which are agreeable with WFP shall be used. Supplier may use ethyl vanillin and vanillin: 7mg/100g as specified in the Codex STAN 074-1981.
- **Other additives and ingredients** (if used) must conform to relevant Codex standards and/or international standards.

Raw materials should be stored under dry, well ventilated and hygienic conditions. Only safe insecticides (i.e. phosphine gas) may be used for fumigation. Where needed, fumigation must be performed by certified operators.

3.3 Vitamins and minerals

HEB shall include a premix consisting of the vitamins and minerals described in Table 1. Suppliers should implement an effective food safety and quality management system for the premix, including supplier performance review/evaluation and premix quality control.

Additionally, the premix shall:

- Be purchased from any of the GAIN approved suppliers, as per the list available at the following link: <http://gpf.gainhealth.org/suppliers/current-suppliers>.
- Be delivered to the processor of **HEB** with a complete Certificate of Analysis and proof for the purchase of premixes. These documents shall be presented to WFP with other documents for payment.
- Be stored in a dry, cool (Below 25 °C), and clean place. According to the storing instructions declared by manufacturer.

For use of premix, the supplier will have to share the supporting data that show that the combination of raw materials, prescribed premix and specific processing steps results in a product of which the specific nutrient content is consistently complying with the labelling declaration.

4. PROCESSING

4.1 Formula

The product formulation shall be based on supplier experience. A clear and full recipe including all ingredients and additives should be shared with WFP and shall comply with the following constraints:

- **Dry Skimmed Milk:** Min. 4.0 g/100g of HEB to ensure addition of quality protein
- **Added Sugar:** Max.15 g/100g of biscuit.
- **Soybean and soybean derivatives** are prohibited to be used as ingredient for production of HEB, except soya lecithin and therefore must be clearly declared on the label of the final product.
- **Micronutrient premix:** As per table 1
- Micronutrient premix could be added to the dough or in pre-blending phase based on available equipment, tools, technology and process is validated. The supplier should develop the appropriate mixing procedures to ensure a good homogeneity of micronutrient in the HEB and it is the supplier's responsibility to ensure that:
 - The product contains the labelled nutrients throughout the shelf life;
 - Process losses are minimised during mixing, baking and processing of dough;
 - Premix does not impact taste in the final product;
- **Energy:** The formula should provide 430 kcal minimum per 100g High Energy Biscuits.
- **Rework** is not permitted except if supplier has quality and food safety controls in place for the storage, handling, traceability, reprocessing (mixing and heat treatment) to ensure that reprocessing of the rework will not affect quality, safety, composition, shelf life and sensory acceptability of the finished product. The use of biscuit rework is maximum 2% of the final product. The supplier needs to perform validation test for the use of rework and to define their internal controls accordingly. The supplier shall also include use of rework in their risk assessment for the HACCP study of this product.

4.2 Homogeneity of micronutrients

Theoretical calculations indicate that a mixing system with a Coefficient of Variation of 10% using iron/vitamin A 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 guide for these calculations is showed at <http://foodqualityandsafety.wfp.org/coefficient-of-variation-calculator>

4.3 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 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 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

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. The maximum level of aflatoxin M1 is less than 0.5 ppb.

Other contaminants

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

The supplier should be aware of Acrylamide³ concern in bakery products which is chemical that can form in some foods during high-temperature cooking processes, such as frying, roasting, and baking. Acrylamide in food forms from sugars and an amino acid that are naturally present in food; it does not come from food packaging or the environment.

³ https://www.fooddrinkeurope.eu/uploads/publications_documents/FoodDrinkEurope_Acrylamide_Toolbox_2019.pdf

5.1.2 Hygiene

It is recommended that the products 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.

The product should comply with any microbiological criteria established in accordance with the Principles for the Establishment and application of microbiological Criteria for Foods (CAC/GL 21-1997)

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

When tested by appropriate methods of sampling and examination, the products:

- 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 Additional requirements

The product should meet any additional food safety and quality requirements as per contract.

5.2 Specific requirements

5.2.1. Fortification

The product must be fortified using the following micronutrient requirements per 100g of High Energy Biscuit (HEB). Premix shall always be used (dosage) as per recommendation from the premix supplier. The approximately addition rate for premix is 7.0 kg/MT of finished product.

Table 1: Premix requirement and chemical forms

Micronutrient	Unit	Chemical Form	Premix to be added per 100g product	Micronutrients at all points of time (Minimum per 100g)
Vitamin A	mcg	Dry Vitamin A Palmitate Cold Water Dispersible Stabilized Beadlet as alternatives options	824.6	500
Thiamine (B1)	mg	Thiamine Mononitrate	1	0.9
Riboflavin (B2)	mg	Riboflavin	1.2	0.9
Niacin (B3)	mg	Niacin amide (= Nicotinamide)	5.9	8
Pantothenic acid	mg	Calcium D-Pantothenate	4.9	4
Pyridoxine (B6)	mg	Pyridoxin hydrochloride	1.1	1
Folic acid (B9)	mcg	Folic acid	243.6	180
Vitamin B12	mcg	Vitamin B12 0.1% or 1% Spray dried	2.2	1.8
Biotin (B7)	mcg	Biotin 1%	20.7	20
Vitamin D	mcg	Dry Vitamin D3 100 Water dispersible stabilized (Beadlet can also be used)	10	5
Vitamin E	aTE mg	Dry Vitamin E acetate 50% Water dispersible	7.4	7
Calcium	mg	Calcium Carbonate; Calcium Phosphate (check P level if the latter is used)	174.1	250
Iron mg (5% bioavailability)	mg	5.6g from Ferric pyrophosphate and 3g from Sodium EDTA	8.6	10
Zinc	mg	Zinc sulphate	5.7	8
Iodine	mcg	Potassium iodate	147.7	120
Phosphorus	mg	Calcium Phosphate	46.9	167

Note: Variable levels of micronutrients (i.e. iron, zinc, calcium, Phosphorus etc.) naturally present in raw materials may also contribute and lead variable of micronutrients in finished product. The product shall meet WFP's specification for all parameters through-out the shelf-life.

5.2.2 Product characteristic

- Organoleptic: The products covered by this specification shall have a typical colour, nice texture, pleasant smell and palatable taste to meet the beneficiary's expectations and acceptance.
- Broken: The percentage of broken HEB must not be more than 5.0% (by weight).
- Weight: One HEB should weigh between 5g and 10g.
- Different shapes of HEB units are accepted; including round, square and rectangular shape.
- The product must also comply with other requirements specified in Table-4.

5.2.3 Shelf life

Unless stated otherwise in the contract, the HEB must have a minimum 12-month shelf-life. The supplier should conduct their own shelf life studies to confirm shelf-life claims for the labelling. The shelf life studies should comply with WFP requirements.

5.2.4 Fit for human consumption guarantee

Suppliers must check the quality of their products and guarantee that the product is 'fit for human consumption'.

6. PACKAGING

6.1 Primary package

The product shall be packaged in food-grade flexible sachets, hermetically sealed and robust enough to withstand multiple handling & transport and protect the product throughout its shelf life.

Each package must contain 50g, 75g, 100g of High Energy Biscuits as per specified in the contract. Weight and quantity tolerance must meet The International Organization of Legal Metrology International Recommendation OIML R 87⁴.

It is the responsibility of the manufacturers to select a packaging material that will protect the HEB from moisture as well as from vitamin and fat degradation during the required 12-months of shelf life.

Sachets shall be:

- Food grade materials compliant with the last amendments of national regulations in the country of production (If not existing: compliance with EU or FDA legislation required).
- Optimized shape to avoid space loss in the sachets and cartons
- Properly sealed (test example: ASTM F2338 – 09, ASTM D3078 – 02 or equivalent)
- The sachets must be placed in an appropriate way in the carton box during the packing process to avoid packaging & product damage
- The laminate must include a high barrier layer to highly reduce permeability of oxygen and water vapour. The minimum requirements⁵ are:
 - WVTR < 0.05 g/m².day (38°C/90% RH) (ASTM F1249-06 or equivalent)
 - OTR < 0.05 cc/m².day (23°C/50% RH) (ASTM D-3985 or equivalent)
- Reverse printing is mandatory

Typically, a laminated film composed of (PET or OPP) + (alu 7) + (PP) (total typical thickness 62mic +/-3) or equivalent can be used.

⁴ OIML R 78 Quantity of commodity in prepackages https://www.oiml.org/en/files/pdf_r/r087-e04.pdf, latest edition to be followed

⁵ Suppliers must submit packaging Certificate of Analysis indicating WVTR and OTR compliance to WFP for technical review.

6.2 Secondary package

The product shall be packed in cartons suitable for the humanitarian supply chain and must contain 100 individual packages, unless otherwise specified in the contract.

It is under supplier responsibility to select a packaging material that will resist to multiple handling and up to 2 meters stacking.

Cartons shall be:

- New, manufactured from well-constructed double wall corrugated board
- With an edge crush resistance of 60ECT = 60 lbs/in eq 11 kN/m (ISO 3037) and a specific weight of 700 to 1000 grams per square meter
- fully filled for maximum strength and dimensions adjusted to the load
- The fluting must be vertical, supporting the load
- The carton should be plain brown
- No stapling will be accepted
- firmly closed (top and bottom)

Unless otherwise specified in the contract, two percent (2%) empty, marked cartons (included in the price) must be sent with the lot.

6.3 Tertiary packaging

If pallets are used inside containers: it is highly recommended to have 3 first bottom layers placed as column stacking, the rest can be interlocked (cross-stacking) for load stability. Pallet must be wrapped in a suitable manner (locked to the pallet, enough containment force) and the cartons should be banded when necessary. The cartons must be secured to pallets in order to prevent any damage to the contents or packaging during shipment. Pallet used should be strong enough to support the charge during transportation. Pallets shall be stackable (minimum double stock) without damage to the cartons during shipment.

If no pallets are used inside container: dunnage (of strong sheets such as carton, plywood...) should be placed inside each container at every three layers of cartons to provide the required stacking strength. In addition, protecting material like air bag, carton, polystyrene, can be used. Also, 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.

For shipping containers, unless fully shrink-wrapped pallets are used, and unless otherwise specified in the contract, it is highly recommended to place desiccant in container at 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.

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.

Empty containers/vehicles shall be clean, pest free and free of damage, odours and previous cargo remains.

7. MARKING

The labelling of the product covered by the provision of this specification shall comply with CODEX STAN 1-1985. Labels of package and carton must be approved by WFP.

Unless otherwise specified in the contract, information in table 4 must be printed on the packaging of the product.

Table 3: Generic marking requirements

	Individual package	Carton
Product name	High Energy Biscuits	
Net weight	100g (or as per contract)	100 x 100g: 10.0 kg
Nutrients content	XX ⁶	-
Ingredient list	XX; (including allergens ⁷)	-
Storage instruction	"Store under dry, ventilated and hygienic conditions and away from direct sunlight"	
Manufacturer name	Produced by: XX	
Manufacturer address	XXX, including country of origin	
Manufacturer batch/lot number	XX	
Production date (dd/mm/yyyy)	XX	
Best Before End (mm/yyyy)	XX	
Other	"not for sale or exchange" "Contains no ingredients of animal origin besides dairy products"	
Donor and WFP logo	as per contractual requirement	
Additional marking	as per contractual requirement	

Note: Nutrient content that will be printed on the package shall be based on analytical reports from accredited laboratory. Values will depend on the premix formula and ingredients of High Energy Biscuits.

Templates for artwork available on: <https://foodqualityandsafety.wfp.org/specifications>

8. STORING

The product must be stored under dry, ventilated and hygienic conditions and away from direct sunlight.

⁶ All XX must be filled by manufacturer.

⁷ Allergen labelling guidelines: All ingredients considered allergens as per EU Regulation 1169/2011 – Annex II - shall be labelled in bold letters in the ingredient list. The supplier is responsible for creating and maintaining an updated list of allergens present in the manufacturing facility. All products manufactured in that facility must be labelled with the entire list of allergens identified in that facility, either as ingredients or as cross-contamination.

For cross contamination labelling, the following terms should be used: "May contain traces of" The addition of new allergens to a facility needs to be evaluated and communicate beforehand, as an update of packaging artwork will be necessary.

9. ANALYTICAL REQUIREMENTS

As per contractual agreement, WFP can appoint an inspection company that will check that the food matches requirements of the specification. Analytical tests in Table 4. are usually utilized, additional test might be performed. Suppliers should follow its own food safety and quality management plan. WFP reserves the rights to change these plans at any time.

Table 4: List of compulsory tests and reference method

No	Tests	Requirements	Reference method (or equivalent, latest version)
1	Moisture content	Max 4.5 %	AACC 44-15.02 ISO 712:2009 AOAC 925.10
2	Organoleptic (smell, taste, colour)	Typical colour, Pleasant smell and palatable taste.	Sensory evaluation
3	Broken biscuits	Max. 5.0 % broken (by weight)	Visual inspection
4	Total Protein	Min. 10g/100g	AOAC 992.23 EN ISO 16634-2:2016
5	Total Fat	Min. 15.0 g/100g	ISO 11085:2015
6	Crude fibre	Max. 2.3 g/100g	AOAC 962.09
7	Peroxide value	Max. 10 meq/kg fat	AOAC 965.33
8	Vitamin A-Retinol	500 – 850 mcg/100g	AOAC 2012.10 2014 UNI EN 12823
9	Iron	10-17 mg/100g	AOAC 2015.06 EN 15763:2010
10	Aerobic mesophilic bacteria	Max. 10,000 cfu/g	ISO 4833-1:2013 ICC No 125 AACC 42-11.01
11	Coliforms	Max. 10 cfu/g	ISO 4832:2006 AOAC 2005.03 AACC 45-15.02
12	Escherichia coli	Absent in 10 g	ISO 16649-2:2001 AOAC 991.14
13	Salmonella	Absent in 25 g	ISO6579-1:2017 AACC 42-25.03
14	Staphylococcus aureus	<10 cfu/g	EN ISO 6888-2:2004 AACC 42-30.04
15	Bacillus cereus	Max. 10 cfu/g	ISO 7932:2004 AOAC 980.31
16	Yeasts and moulds	Max. 100 cfu/g	ISO 21527-2:2008 ICC No 146 AACC 42-50.02

Note: Other micronutrient tracers can be analysed instead of Vitamin A-Retinol and Iron, as per the minimum requirements stated in Table 4 for some exceptional cases.