Technical Specifications for

BARLEY GRAIN

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1. SCOPE

This specification applies to **Barley** grains obtained from varieties of the species *Hordeum vulgare* L. purchased by WFP.

2. DEFINITIONS

Broken kernels are pieces that are less than three-quarters of a whole kernel and kernels with the germ end broken off.

Fireburnt kernels charred or scorched by fire. A cross-section of a fireburnt kernel resembles charcoal with numerous air holes. The air holes result in a low weight kernel which crumbles easily under pressure.

Frost:

For varieties with hulls—frost-damaged kernels have distinctly indented backs, and usually a loose hull. Kernels with a light wrinkling from frost are not considered frost-damaged.

For hulless varieties—frost-damaged kernels have severe wrinkling and translucent endosperms.

Heated kernels have the colour or odour typical of grain that has deteriorated in storage or has been damaged by artificial drying. The hull over the germ of the heated kernels often appears discoloured, usually to a golden brown.

Rotted kernels are discoloured, swollen, soft and spongy as a result of decomposition by fungi or bacteria. Consider rotted kernels in combination with severely mildewed and heated.

Mildew is a fungal condition that develops in unthreshed grain usually under conditions of excessive moisture. The affected kernels are grayish in colour and lower in quality. In the evaluation of mildew, consider the number of affected kernels and their severity.

Severe mildew refers to kernels that are severely blackened by mildew. See *Mildew*. Consider severe mildew in combination with rotted and heated kernels.

Sprouted kernels show definite signs of germination.

Ergot is a plant disease producing elongated fungus bodies with a purplish-black exterior, a purplish-white to off white interior, and a relatively smooth surface texture.

Inseparable seeds are those not removed by the cleaning process, usually large seeds including grains other than cereal grains, such as peas, beans, corn, flaxseed and domestic buckwheat.

Other cereal grains include wheat, rye, oats or triticale remaining in the cleaned sample. For grading purposes, spelt and Kamut® are considered as *Other cereal grains* in samples of barley.

Sclerotinia sclerotiorum is a fungus producing hard masses of fungal tissue, called *sclerotia*. The sclerotia vary in size and shape, have a course surface texture, vary in exterior color from dark black to gray to white and have a pure white interior.

Stones are hard shale, coal, hard earth pellets, and any other non toxic materials of similar consistency. Fertilizer pellets are assessed as stones when constituting 1.0% or less of the net sample weight.

Total foreign material includes Ergot, Excreta, Inseparable seeds, Other cereal grains, Sclerotinia and Stone.

3. REFERENCE

Codex Standard for Wheat grains CODEX STAN 199-1995.
Official Grain Grading Guide_6.Barley_ Canadian Grain Commission_August 1, 2012.
Grain Trade Australia_Section 2_Barley Standards_2013/2014 Season

4. PRODUCT SPECIFICATION

4.1 General requirements

Barley must be:

- bright, clear appearance, natural smell and color.
- free from abnormal flavour, odours, living insects,
- safe and suitable for human consumption

If required by recipient country, **Barley** needs to be obtained from non-genetically modified varieties.

4.2. Specific requirements

Barley must conform to the requirements specified in table 2.

4.3 Toxic or noxious seeds

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

– Crotolaria (*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.

4.4 Contaminants

4.4.1 Heavy metals

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

4.4.2 Pesticide residues

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

4.4.3 Mycotoxins

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

4.5 Hygiene

4.5.1 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.

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

4.5.3 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. PACKAGING AND MARKING

The below requirements are only applied for purchases of **Barley** packed in bags.

5.1 Packaging

Bags for **Barley** must comply with below requirements:

- Bags is made of woven polypropylene (PP) are to be given special food grade "ultraviolet" treatment.
- Bags must be new, uniform, strong, fit for export and multiple handing.
- Construction of fabric must be solid to sustain harsh handling.
- Bags have a heat cut mouth to prevent fibrillation and have sewn single folder bottom.
- Bags must be closed by double stitching with suitable thread.
- Bags must be clean, sound and free from insect, fungal infestation.
- Bags must withstand to the breakage up to 6 drops (one drops each side of bags) following the standard drop test method (EN 277, ISO 7965-2 or equivalent).

5.2 Marking

Below information must be printed on the bags:

- Name of the product
- Net weight
- Name of supplier
- Additional marking as per contractual agreement.

6. STORING

Barley must be stored under dry, ventilated and hygienic conditions.

7. SAMPLING REQUIREMENTS

Representative samples must be drawn according to international sampling standards in supplier's warehouse and/or at the bagging section. One laboratory sample and 2 retention samples of 3 kg are required by lot or sub-lot.

For bags, sampling rule in Gafta 124-2 should be applied. Example of sampling frequency for lots of 100-500MT is showed in table 1.

For the bulk (static and flowing), the sampling should follow the rules described in ISO 24333-2009.

*Table 1: Sampling rules for **Barley** in bags*

Lot or sub-lot size (MT)	**Number of increment**	**Place of sampling**	**Reference**
≤100	3 % of total bags and minimum 50 bags (*e.g. 60 increments for a lot of 100 MT, packed in 50 kg bag)*	At supplier's warehouse and /or at bagging section	GAFTA 124-2
101-500	3 % of total bags *Example, for bags of 50kg:* - *120 increments for a lot of 200 MT* - *180 increments for a lot of 300 MT* - *240 increments for a lot of 400 MT* - *300 increments for a lot of 500 MT*		

8. ANALYTICAL REQUIREMENTS

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

Table 2: List of compulsory tests and reference methods

No	**Analyses/tests**	**Limit**	**Reference methods** *(or equivalent)*
1	Moisture	Max. **14.0 %**	ISO 712
2	Protein	**9.0-12.8%**	ICC No. 105
3	Organoleptic	**Bright, clear appearance, natural smell and color**	*Organoleptic examination*
4	Test weight	Min. **65kg/hl**	ISO 7971-1
5	Broken kernels	Max. **4.0%**	*Visual examination*
6	Fire burnt	**Nil**	*Visual examination*
7	Frost	Max. **2.0%**	*Visual examination*
8	Heated, rotted, severely mildewed	Max. **0.2%**	*Visual examination*
9	Sprouted	Max. **0.5%**	*Visual examination*
10	Ergot	Max. **0.02%**	*Visual examination*
11	Excreta	Max. **0.01%**	*Visual examination*
12	Inseparable seeds	Max. **0.2%**	*Visual examination*
13	Other cereal	Max. **2.0%**	*Visual examination*
14	Sclerotinia	Max. **0.02%**	*Visual examination*
15	Stone	Max. **0.02%**	*Visual examination*
16	Total foreign material	Max. **2.0%**	-
17	Live insect	**Nil**	*Visual examination*

Guide for grading is showed at annex 1.

Annex 1: Guide for grading of barley grain

The grading shall be performed as follow:

- Draw and weight a test portion (about 1000gr)
- Separate the test portion into component groups
- Weigh materials of the component groups
- Express the amount of material groups in percentage (see guide in table 3)

Table 3: Record sheet for grading of barley grain

Mass of the test portion *(grams)* ….. gr (M)		
Component	**Mass of component (grams)**	**Result calculation (expressed in %)**
Broken kernels	a	= a x 100 / M
Fire burnt	b	= b x 100 / M
Frost	c	= c x 100 / M
Heated, rotted, severely mildewed	d	= d x 100 / M
Sprouted	e	= e x 100 / M
Ergot	f	= f x 100 / M
Excreta	g	= g x 100 / M
Inseparable seeds	h	= h x 100 / M
Other cereal	i	= i x 100 / M
Sclerotinia	j	= j x 100 / M
Stone	k	= k x 100 / M
Total foreign material		= (f+ g+ h+ i+ j+ k) x 100 / M