



Technical Specifications for WHEAT GRAIN

Specification reference: **Wheat grain- Generic specification**

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1. SCOPE

This specification applies to **Wheat** grains obtained from varieties of the species *Triticum aestivum* L. purchased by WFP.

2. DEFINITIONS

Broken kernels are pieces of wheat that are less than three-quarters of a whole kernel. If the piece is more than three-quarters of a kernel, it is considered whole.

Shrunken and broken kernels are all matter that passes through a 1.7 mm x 20 oblong-holed metal sieve.

Degermed kernels are wheat whose germ has been removed through the mechanical handling process or by insect attack. Degermed kernels lack the greyish discolouration that is often present with sprouted kernels.

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

Sprouted grains are Grains in which the radicle or plumule exceeded the seed coat bounds; grains from which the radicle or plumule have been removed, with clearly visible deformation and changed seed coat color in the germ area.

Heat-damaged kernels include kernels, pieces of wheat kernels that are materially discolored and damaged by artificial drying. They range from orange-red to very dark brown, but are not black.

Natural stain kernels are stained kernels because of contact with natural substances such as bunt spores, soil or weeds.

Mouldy kernels are discoloured, swollen and soft as a result of decomposition by fungi or bacteria. They have mould visible to the naked eye and may feel spongy under pressure.

Damaged kernels include kernels, pieces of wheat kernels, and other grains that are badly ground-damaged, badly weather-damaged, diseased, frost-damaged, germ-damaged, heat-damaged, insect-bored, mold-damaged, sprout-damaged, or otherwise materially damaged.

Edible grains include all grain other than wheat which are fit for eaten by humans.

Organic matter are all organic components (e.g fragments of stems, leaves, ears, awns, chaff, fragments of pests, seeds of weeds and other cultivated plants, etc) other than grains of wheat, edible grains and filth.

Inorganic matter is defined as any inorganic component (e.g stones, dust, plastic...)

Filth are impurities of animal origin, including dead insect.

3. REFERENCE

Codex Standard for Wheat grains CODEX STAN 199-1995.
Wheat USDA:FSA:PDD:EOB.

4. PRODUCT SPECIFICATION

4.1 General requirements

• Moisture:	14.0 % max
• Organoleptic:	Bright, clear appearance, natural smell and color
• Test weight:	74 kg/hl min
• Shrunken and broken kernels:	5.0% max
• Insect damaged kernels:	1.5% max
• Ergot :	0.05% max
• Sprouted kernels:	2.0% max
• Total damaged kernels:	6.0% max
• Edible grain other than wheat:	2.0% max
• Organic matter (other than edible grains of cereal):	1.5% max
• Inorganic matter:	0.05% max
• Filth:	0.1% max
• Live insect:	Nil

4.2 Flour characteristics

Flour sample prepared from wheat grain with extraction rate of 75.0% shall have below characteristics:

• Protein content:	11.0% min
• Wet gluten:	25.0 min
• Hagberg falling number :	230 min
• Chopin Alveograph	
W:	215 min
P:	80 min
L:	80 min

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

4.3 Contaminants and Toxins

Wheat shall not contain contaminants and toxins in amounts which may represent a hazard to human health. Specific limit of some contaminants and toxins are presented in table 1.

Table 1: Limit of contaminants and toxins

No	Contaminant and toxin	Limit
Heavy metal		
1	Arsenic (As)	1.1 ppm max.
2	Copper (Cu)	30 ppm max
3	Lead (Pb)	2.5 ppm max.
4	Cadmium (Cd)	1.5 ppm max.
5	Tin (Sn)	250 ppm max.
6	Zinc (Zn)	50 ppm max.
7	Mercury (Hg)	1.0 ppm max.
Pesticide residues		
8	Carbamate	< 10 ppb
9	Organochlorine	< 10 ppb
10	Organophosphorus	< 10 ppb
11	Pyrethroid	< 10 ppb
Radiation		
12	Radiation	10 Bq/Kg max
Mycotoxins		
13	Zearalenone	100 ppb max
14	Ochratoxin A	5 ppb max

5. PACKAGING AND MARKING

As per contractual agreement.

6. STORING

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

7. SAMPLING REQUIREMENTS

Representative samples can be drawn according to international sampling method standards at the bagging section or in the warehouse.

For packed units, sampling frequency and reference method are showed in *table 2*. One laboratory samples of about 3kg is required by lot or sub-lot of 500MT maximum.

For the bulk (static and flowing), the sampling must follow the rules described in paragraphs 5.2 of ISO 24333-2009.

Table 2: Sampling rules

Lot or sub-lot size (MT)	Number of increment	Place of sampling	Reference
≤100	3 % of bags and minimum 50 bags (e.g. 60 increments for a lot of 100 MT, packed in 50 kg bag)	Warehouse	GAFTA 124-2
101-200	3 % of bags (e.g. 120 increments for a lot of 200 MT, packed in 50 kg bag)		
201-300	3 % of bags (e.g. 180 increments for a lot of 300 MT, packed in 50 kg bag)		
301-400	3 % of bags (e.g. 240 increments for a lot of 400 MT, packed in 50 kg bag)		
401-500	3 % of bags (e.g. 300 increments for a lot of 500 MT, packed in 50 kg bag)		

8. ANALYTICAL REQUIREMENTS

The principal tests in table 3 must be performed in order to check if the quality of the **Wheat** meets above requirements. Additional analyses shall be defined in case of further quality assessment.

Table 3: List of compulsory tests and reference methods

No	Analyses/tests	Limit	Referenced method (or equivalent)
<i>On wheat grain sample</i>			
1	Moisture	14.0 % max	ISO 711-2009
2	Organoleptic	Bright, clear appearance, natural smell and color	<i>Visual inspection</i>
3	Test weight	74 kg/hl min	ISO 7971-1986
4	Shrunken and broken kernels	5.0% max	ISO 5223-1983
5	Insect damaged kernels	1.5% max	<i>Visual inspection</i>
6	Ergot	0.05% max	<i>Visual inspection</i>
7	Sprouted kernels	2.0% max	<i>Visual inspection</i>
8	Total damaged kernels	6.0% max	ISO 1970-1987
9	Edible grain other than wheat	2.0% max	ISO 1970-1987
10	Organic matter (other than edible grains of cereal)	1.5% max	<i>Visual inspection</i>
11	Inorganic matter	0.05% max	<i>Visual inspection</i>
12	Filth	0.1% max	<i>Visual inspection</i>
13	Live insect	Nil	<i>Visual inspection</i>
<i>On flour sample milled from wheat grain with extraction rate of 75.0%</i>			
14	Protein content	11.0% min	ICC No. 105
15	Wet gluten	25.0 min	ISO 21415-1
16	Hagberg falling number	230 min	ISO 3093
	Chopin Alveograph		
17	W	215 min	ISO 27971
18	P	80 min	
19	L	80 min	

Guide for grading is showed at annex 1.

Annex 1: Guide for grading of wheat grain

The grading shall be performed as follow:

- Draw and weight a test portion
- 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 4)

Table 4: Record sheet for grading of wheat grain

Mass of the test portion (grams)- M gr		
Component	Mass of component (grams)	Result calculation (expressed in % by mass of the test portion)
Shrunken and broken kernels	a	$= a \times 100 / M$
Insect damaged kernels	b	$= b \times 100 / M$
Ergot	c	$= c \times 100 / M$
Sprouted kernels	d	$= d \times 100 / M$
<i>Degermed kernels</i>	e	
<i>Ergot</i>		
<i>Sprouted grains</i>		
<i>Heat-damaged kernels</i>		
<i>Natural stain kernels</i>		
<i>Mouldy kernels</i>		
<i>Other damaged</i>		
Total damaged kernels		$= (a + b + c + d + e) \times 100 / M$
Edible grain other than wheat	f	$= f \times 100 / M$
Organic matter (other than edible grains of cereal)	g	$= g \times 100 / M$
Inorganic matter	h	$= h \times 100 / M$
Filth	k	$= k \times 100 / M$