



World Food
Programme

Technical Specifications for

SORGHUM GRAINS

Commodity code: **CERSOR010**

Version: **2, adopted 2020**

Replacing: **Sorghum; Ver. 1, dated 18.03.2020**

Date of **OSCQ** issue: **12.05.2020**

*This version replaces the version 1 adopted in 18.03.2020
The adjustments are:
-Examination of toxic or noxious seeds – tolerance limit
-Breakdown on total defects*

1. SCOPE

This specification applies to sorghum grains (hereafter called the commodity) distributed by WFP. Sorghum grains are obtained from species of *Sorghum bicolor* (L.) Moench. It does not apply to other products derived from sorghum grains.

2. STANDARDS AND RECOMMENDATIONS

- Codex Standard for sorghum grains (Codex Stan 172-1989, rev. 1-1995, Amd. 2019) use latest version.
- 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 standard for contaminants and toxins in food and feed: CODEX STAN 193- 1995.
- Regulation governing the tolerance of certain seeds in certain agricultural products: South Africa Govt Notice No. R.1225, 4 October 2002.

3. DEFINITIONS

Whole sorghum grains are obtained after a complete threshing without any further treatment.

Decorticated sorghum grains are obtained from which the external casings and whole or part of germ have been removed in an appropriate manner, using mechanical treatment.

Defects include extraneous matter, inorganic extraneous matter and filth as defined in the specification. Defects contain grains that are badly ground damaged, badly weather damaged, diseased, frost-damaged, germ-damaged, blemished grains, heat-damaged, insect bored, mould-damaged, sprout damaged or otherwise materially damaged.

Broken grains mean sorghum or pieces of sorghum which pass through a 1.8mm diameter round-hole sieve; Codex definition.

Diseased grains which made unsafe for human consumption due to delay. Moulding, or bacterial decomposition, or other causes that may be noticed without having to cut grains open to examine them.

Insect or vermin damage grains which have evidence of boring or tunnelling, indicating the presence of insects, insect webbing or insect refuse or degermed grains, chewed in one or more than one part of the kernel which exhibit evident traces of an attack by vermin.

Abnormal colour grains whose natural colour has been modified by bad weather conditions, contact with the ground, heat, excessive respiration. These grains may be dull, shrivelled, swollen, puffed, or bloated in appearance.

Sprouted grains which exhibiting obvious signs of sprouting

Immature and shrivelled grains that are not properly developed.

Other grains which are edible grains, whole or identifiable broken, other than sorghum (legumes, pulses and other edible cereals)

Extraneous matter is all organic and inorganic materials other than sorghum grains, broken kernels, other grains and filth. Extraneous matter includes loose sorghum seedcoats.

Filth is impurities of animal origin including dead insects.

4. COMMODITY SPECIFICATION

4.1 General requirements

4.1.1 Quality Characteristics

The commodity shall meet following quality characteristic requirements;

- Shall be safe and suitable for human consumption.
- Shall be free from abnormal flavours, odours, and living insects.
- Shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.
- Shall be stored under dry, ventilated and hygienic conditions. Only authorized insecticides (e.g. phosphine) may be used for fumigation control. Where needed, fumigation shall be performed by certified operators and as specified in the GAFTA Standard for Fumigation¹.

4.1.2 Toxic or noxious seeds

On-site visual check for the toxic seeds shall be performed as per SOW for Inspection.

The commodity shall be free from the following toxic or noxious seeds in amounts which may represent a hazard to human health. See table 2 for tolerance of certain seeds.

– *Crotalaria (Crotalaria spp.)*, Corn cockle (*Agrostemma githago* Linn., *Machai Lallium remulenum* Linn.), Castor bean (*Ricinus communis* L.), Jimson weed (*Datura fastuosa* Linn and *Datura stramonium* Linn.), Mexican Prickly Poppy (*Argemone mexicana*), and other seeds that are commonly recognized as harmful to health.

4.2 Contaminants

4.2.1 Heavy metals

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

4.2.2 Pesticide residues

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

4.2.3 Mycotoxins

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

4.2.4 Other contaminants

¹https://www.gafta.com/write/MediaUploads/Trade%20Assurance/Gafta_Standard_for_Fumigation_WEB.PDF

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

4.3 Non-GMO Status

The commodity shall comply with Non-GMO crop if required by the recipient Country or regulations.

4.4 Hygiene

It is recommended that the commodity covered by the provisions of this specification 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 this commodity.

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

- Be free from micro-organisms in amounts which may represent a hazard to health
- Be free from parasites which may represent a hazard to health
- Not contain any substance originating from pathogenic micro-organisms, including fungi, in amounts which may represent a hazard to health

5. PACKAGING

5.1 General requirements

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

All the materials in contact with the food product (including inks and additives) shall comply with the last amendments of national regulations in the country of production (if not existing: compliance with EU or FDA legislations requested). Bags shall be new, uniform, strong, fit for export and multiple handling, these shall be clean, sturdy and strongly sewn or sealed.

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 shall meet The International Organization of Legal Metrology International Recommendation OIML R 87².

5.3 Packaging requirements

Material composition:

- Virgin materials only for PP (recycled material (rPP) or colorant not allowed) – rPP should be used only after confirmation from WFP
- CaCO₃ (PP woven bag): max 3% used as an additive
- Minimum grammage of 88 gsm +/-3gsm,
- Weft density: 10 tapes/inch =40 tapes/10 centimetre,
- Warp density: 10 tapes/inch =40 tapes/10 centimetre,
- Titer minimum:1000 Denier (gram/9000 meter)
- Tape width (mm): from 2.5 to 3
- Heat cut to prevent fibrillation,
- Tensile strength: min 4.5g/denier (strip test based on DIN EN ISO 13934-1)

² OIML R 78 Quantity of commodity in prepackages https://www.oiml.org/en/files/pdf_r/r087-e04.pdf, latest edition to be followed

- Sewn with single fold with 1 stitched bottom (with a minimum 4 dots per inch (=4 dots per 25.4 mm))
- Sewing yarn shall be made from PP multifilament (top and bottom of the bag)
- It is the responsibility of the supplier to define the size of the bag suitable for the net content.

5.4 Compliance Tests:

The bags of finished commodity shall 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) shall be sent with the lot.

5.5 Stuffing of Containers and other transport vehicles³

Use of desiccant is mandatory in each container to absorb moisture and condensation during shipment to preserve the commodity and packaging performance (exception made for sugar). The following table provides a guideline on the quantity to be used;

Table 1: 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. Empty containers/vehicles shall be clean, pest free and free of damage, odours and previous cargo remains. Ventilation holes shall remain clear and unsealed.

6. SHELF LIFE

Shelf life (BBE) requirement of the commodity shall be marked if required by a receipt country and/or contractual agreement.

7. MARKING

The labelling of the commodity covered by the provision of this specification shall comply with CODEX STAN 1-1985 The following information should be available on bags:

- Name of the Commodity
- Net content
- Crop year
- Name and address of the supplier
- Country of origin
- Lot/Batch number
- Not for Sale

Additional marking is as per contractual agreement.

³ For more details, please refer to container loading procedure:

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

8. STORAGE

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

9. ANALYTICAL REQUIREMENTS

As per contractual agreement, WFP will appoint an inspection company that will check that the commodity matches requirements specified in Table 2. Additional tests may be defined in case further quality assessment is required. WFP may reserve the right to change the testing plan when required.

Table 2: List of compulsory tests and reference methods

No	Analyses/tests	Limits	Reference methods or equivalent validated methods
1	Organoleptic	Natural state, smell & colour ⁴	Organoleptic, ISO 605
2	Moisture	Max. 13.0 %	ISO 712:2009 ICC Method No 110/1 (1986)
3	Protein (N x 6.25) (<i>dry matter basis</i>)	Min. 7.0 %	ICC 105/1 (1986) ISO 20483:2013
4	Fat (<i>dry matter basis</i>)	Max. 4.0 %	AOAC 945.38F, 920.39C ISO 11085:2015; ISO 5986:1983
5	Tannin (<i>dry matter basis</i>)	Max. 0.5 % (whole sorghum) Max. 0.3 % (decorticated grains)	ISO 9648:1988
6	Ash (<i>dry matter basis</i>)	Max. 2.0 % (whole grains) Max. 1.5 % (decorticated grains)	AOAC 923.03 ICC No. 104/1(1990) ISO 2171:2007
7	Total defective grains	Max. 8.0% (total defects)	ISO 605
7.a	<i>Diseased grains; insect/vermin damaged; abnormal color grains</i>	<i>Max. 3.0 % by weight</i>	ISO 605
7.a.i	<i>Diseased grain (of which, included in 7.a)</i>	<i>Max. 0.5% by weight</i>	ISO 605
7.b	<i>Sprouted grains</i>	<i>Max. 5.0% by weight</i>	ISO 605
7.c	<i>Frost-damaged grains; other edible grains</i>	<i>Max. 1.0% by weight</i>	ISO 605
8	Broken grains (<i>pass through a 1.8mm round-hole sieve</i>)	Max. 4.0 % by weight	ISO 605
9	Extraneous matter	Max. 2.0 % by weight	ISO 605
9.a	<i>Inorganic matter (of which included in 9)</i>	<i>Max. 0.5% by weight</i>	ISO 605
10	Dead insect (Filth)	Max. 0.1% by weight	ISO 605
11	Live weevils	Nil	Visual examination
12	Total Aflatoxins (B1+B2+G1+G2)	Max. 20 ppb	ISO 16050:2003

⁴ white, pink, red, brown, orange, or yellow color sorghum grains may be specified as per recipient country preference

13	Visual examination of toxic or noxious seeds - Crotonia (<i>Crotalaria spp.</i>) - Jimson weed (<i>Datura spp.</i>) - Castor bean (<i>Ricinus communis</i> L.) - Corn cockle (<i>Agrostemma githago</i> L.)	Max. 1 seed per 1kg	Visual examination on one kg sample (size of sample as per GAFTA sampling rules) ⁵
	- Mexican Poppy (<i>Argemone mexicana</i>) - Cocklebur* (<i>Xanthium species</i>) - Field bindweed (<i>Convolvulus spp.</i>) - Darnel Ryegrass (<i>Lolium temulentum</i>) - Morning glory (<i>Ipomoea purpurea</i>)	Maximum 7 seeds per 1kg	

*Cocklebur one pod usually has 2 seeds.

- [Datura](https://www.inspection.gc.ca/plant-health/seeds/seed-testing-and-grading/seeds-identification/datura-stramonium/eng/1476290557484/1476290557859) - <https://www.inspection.gc.ca/plant-health/seeds/seed-testing-and-grading/seeds-identification/datura-stramonium/eng/1476290557484/1476290557859>
- [Mexican poppy](https://www.graintrade.org.au/sites/default/files/file/Publications/Seed%20Impurities%20of%20Grain%20an%20identi%20kit%20(1).pdf) - [https://www.graintrade.org.au/sites/default/files/file/Publications/Seed%20Impurities%20of%20Grain%20an%20identi%20kit%20\(1\).pdf](https://www.graintrade.org.au/sites/default/files/file/Publications/Seed%20Impurities%20of%20Grain%20an%20identi%20kit%20(1).pdf) (page 85)
- [Crotonia](https://www.gipsa.usda.gov/vri/crotvelvet.aspx) - <https://www.gipsa.usda.gov/vri/crotvelvet.aspx>
- [Castor](https://www.graintrade.org.au/sites/default/files/file/Publications/Seed%20Impurities%20of%20Grain%20an%20identi%20kit%20(1).pdf) - [https://www.graintrade.org.au/sites/default/files/file/Publications/Seed%20Impurities%20of%20Grain%20an%20identi%20kit%20\(1\).pdf](https://www.graintrade.org.au/sites/default/files/file/Publications/Seed%20Impurities%20of%20Grain%20an%20identi%20kit%20(1).pdf) (page 126)
- [Cocklebur/Corn Cockle](https://www.gipsa.usda.gov/vri/cocklebur.aspx) - <https://www.gipsa.usda.gov/vri/cocklebur.aspx>

⁵ <https://www.inspection.gc.ca/plants/seeds/testing-grading/seeds-identification/eng/1333136604307/1333136685768>
<http://weedseeds.graintrade.org.au/>