**NATIONAL STANDARD OF UKRAINE**

# WHEAT
# Technical specifications
## DSTU 3768:2010

***Official publication***
***Free translation from Ukrainian***

**Kyiv**
**DERZHSPOZHYVCHSTANDART OF UKRAINE**
**2010**

*Free translation from Ukrainian*
*Translator:* ***O. Onischenko***
*This translation is done within implementation of Canada-Ukraine Grain Project «Grain Quality and Rural Agriculture Credit Systems in Ukraine – Phase 2»*

## FOREWORD

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**2** APPROVED AND ENTERS INTO FORCE by the Order of Derzhspozhyvchstandart of Ukraine (the State Standard Committee) № 108 dated 31 March 2010

**3** REPLACES DSTU 3768-2009

| List of abbreviations* (Translator's remarks) | |
|---|---|
| DSTU | National Standard of Ukraine |
| GOST | Inter-country Standard, predominantly applied in the territory of the former USSR |
| MBP | Medical and biological requirements |
| CH | Sanitary standards (norms) |
| DSanPiN | State Sanitary Rules and Norms |
| MP | Procedural Guidelines (рекомендации) |
| MU | Procedural Direction (указания) |
| GN | State Sanitary norms of Ukraine |
| DSP | State Sanitary Rules of Ukraine |
| OSSS | Occupational safety standards system |



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# DSTU 3768:2010

## NATIONAL STANDARD OF UKRAINE

# WHEAT
# Specifications

**Effective from 2010-04-01**

## 1 SCOPE

**1.1** The present standard applies to Common wheat (Triticum aestivum L.) and Durum wheat (Triticum durum Desf.) destined for use in food and nonfood purpose and for trade.

**1.2** Obligatory requirements for wheat grain, which guarantee human and animals life and health safety and preservation of the environment are stated in sections 4 (4.9, 4.10, 4.11) and 5.

## 2 NORMATIVE REFERENCES

This Standard refers to the following documents:

DSTU 2422-94 Grain for supplies and delivery. Terms and definitions

DSTU 3355-96 Agricultural products of plant. Technique of inspection and sampling for quarantine examination and expertise

DSTU 4117:2007 Grain and product of its processing. Determination of index of quality by Spectroscopy in Near Infrared Field

DSTU 4233-2003 (ISO7971-1:1986, MOD) Cereals. Determination of bulk density, called "mass per hectolitre". Part 1. Reference method

DSTU 4234-2003 (ISO7971-2:1995, MOD) Cereals. Determination of bulk density called "mass per hectolitre". Part 2. Routine method

DSTU GOST 29144:2009 (ISO 711-85) Cereals and cereal products. Determination of moisture content (basic reference method) (GOST 29144-91) (ISO 711-85), IDT)

DSTU ISO 6639-1:2007 Cereals and pulses. Determination of hidden insect infestation. Part 1. General principles (ISO 6639-1:1986, IDT)

DSTU ISO 6639-2:2007 Cereals and pulses. Determination of hidden insect infestation. Part 2. Sampling (ISO 6639-2:1986, IDT)

DSTU ISO 6639-3:2007 Cereals and pulses. Determination of hidden insect infestation. Part 3. Reference method (ISO 6639-3:1986, IDT)

DSTU IS0 6639-4 Cereals and pulses. Determination of hidden insect infestation. Part 4. Rapid methods (ISO 6639-4:1986, IDT) [1)]

DSTU ISO 13690-2003 Cereals, pulses and milled products. Sampling (ISO13690:1999, IDT)

DSTU ISO 21415-1:2009 Wheat and wheat flour. Gluten content. Part 1. Determination of wet gluten by a manual method

[1)] Under consideration

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DSTU ISO 21415-2:2009 Wheat and wheat flour. Gluten content. Part 2. Determination of dry gluten by mechanical means

DSTU EN 12955-2001 Foodstuffs. Determination of aflatoxin B1 and the sum of aflatoxins B1, B2, G1 and G2 in cereals, shell-fruits and derived products. High performance liquid chromatographic method with post column derivatization and immunoaffinity column clean up

DSTU EN ISO 15141-1-2001 Foodstuffs. Determination of ochratoxin A in cereals and cereal products. Part 1. High performance liquid chromatographic method with silica gel clean up

DSTU EN ISO 15141-2-2001 Foodstuffs. Determination of ochratoxin A in cereals and cereal products. Part 2. High performance liquid chromatographic method with bicarbonate clean up

GOST 12.1.005-88 OSSS. Occupational safety standards system. General sanitary requirements for working zone air

GOST 17.2.3.02-78 Protection of Nature. Atmosphere. Regulations for establishing permissible emissions of noxious pollutants from industrial enterprises

GOST 10840-64 Grain. Methods for determination of hectolitre weight

GOST 10846-91 Grain and products of its processing. Method for determination of protein

GOST 10967-90 Grain. Methods for determination of odour and colour

GOST 10987-76 Grain. Methods for determination of vitreousness

GOST 13586.1-68 Grain. Methods for determination of quantity and quality of gluten in wheat

GOST 13586.3-83 Grain. Acceptance rules and sampling methods

GOST 13586.4-83 Grain. Methods for determination of infested grain and its damage

GOST 13586.5-93 Grain. Method of moisture content determination

GOST 24104-88 General purpose Laboratory balances and comparison balances.

Performance Specifications

GOST 25706-83 Magnifiers. Types, basic parameters. General technical requirements

GOST 26927-86 Raw material and food-stuffs. Methods for determination of mercury

GOST 26929-94 Raw material and food-stuffs. Preparation of samples. Decomposition of organic matters for analysis of toxic elements

GOST 26930-86 Raw material and food-stuffs. Methods for determination of arsenic

GOST 26931-86 Raw materials and food-stuffs. Method for determination of copper

GOST 26932-86 Raw materials and food products. Methods for determination of lead

GOST 26933-86 Raw materials and food-stuff. Methods for determination of cadmium

GOST 26934-86 Raw materials and food-stuffs. Method for determination of zinc

GOST 27676-88 Cereals and cereal milled products. Method for determination of falling number

GOST 29143-91 (ISO 712-85) Cereals and cereal products. Determination of moisture content (routine reference method)

GOST 30483-97 Grain. Methods for determination of general and fractional content of extraneous matter and damaged grains; content of small grains and grain size; content of grains attacked by pests; metallic particles

GOST 30498-97 (ISO 3093-82) Cereals. Determination of falling number

GOST 30538–97 Food-stuffs. Analysis of toxic elements by atomic-emission method

## 3 TERMS AND DEFINITIONS

Terminology and correspondent definitions are used in the standard in accordance with DSTU 2422 and other normative legal documents acting in Ukraine, in particular:

**Impurities**

Impurities of an organic and inorganic origin, which are divided on Grain and Waste impurities and affecting wheat quality

### 3.1 Grain impurities

#### 3.1.1 broken grains

All grains whose endosperm is partially uncovered or grains from which the germ has been removed as a result of mechanical activity

#### 3.1.2 shrivelled grains

Grains damaged by frost and unripe grains (green), as well as small and shrunken grains, which, after elimination from the sample of all other matter referred to Grain and Waste impurities, pass through a sieve with long rounded apertures of the following dimensions: 2.0 x 20.0 mm for common wheat and 1.9 x 20.0 mm for durum wheat

#### 3.1.3 sprouted grains

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

#### 3.1.4 overheated grains

Grains with changed seed coat color due to heating during drying or spontaneous heat generation and sound endosperm, which color has not undergone changes

#### 3.1.5 grains eaten by pests

Grains eaten by pests irrespective of the stage of their damage

#### 3.1.6 grains of cereals

Not spoiled grains of rye, triticale and barley

#### 3.1.7 grains in which the germ is discolored

Grains with normal and not sprouted germ and seed coat at the germ area colored brown to brownish black. This discoloration (darkening as a result of fungus or bacterial affection) is located at the germ area and extends (from one side at least) into the grains crease (Annex D)

### 3.2 Waste impurities

#### 3.2.1 mineral impurities

Impurities of inorganic origin (sand, lumps of earth, pebble, etc.) retained by a sieve with long rounded apertures of 1.0 x 20.0 mm and all matter of organic and inorganic origin passing through the mentioned sieve (fines)

#### 3.2.2 organic impurities

All organic components other than grains of wheat, grains of cereals and harmful impurities: fragments of stems, leaves, ears, awns, chaff, fragments of pests, seeds of weeds and other cultivated plants, etc.

**3.2.3 harmful impurities**

Phytogenous impurities, which if present in the certain quantities have a harmful and dangerous effect for humans and animals health, organoleptic properties or technological performance: smut, ergot, harmful and toxic seeds according to Annex E

**3.2.4 spoiled grains**

Grains presenting specks of rottenness, mould, downy mildew, bacterial or other damage; with changed seed coat and endosperm color due to spontaneous heat generation or too extreme heating during drying and/or with crumbly endosperm.

Fusarium affected grains also belong to this group – grains contaminated by the Fusarium disease, whitish, chalky with complete loss of shine, sometimes with salmon spots, shrunken, unviable

**3.3 Bug-ridden grains**

Grains with black point at the surface as a result of bug (Eurygaster integriceps Put) nibble with clearly visible bright-yellow spot of round or irregular shape situated around the point; grains with the same spot on the surface with impression or wrinkle at the spot area without nibble point; grains with the same spot at the germ area without impression or wrinkle and without nibble point; in all cases endosperm consistence under the spot is easily crumbled, pulverized, or reduced to powder

**3.4 Smutty grains**

Grains with brush, crease or part of the surface covered with smut spores, which appearance at first to be determined visually and if necessary to be confirmed by mycological examination

**3.5 Wheat of unimpaired quality, Grain and Waste impurities composition**

**3.5.1** ***Wheat of unimpaired quality:***

– Whole and damaged wheat grains, which are not included by the nature of their damage in Grain and Waste impurities;

– Grains in which the germ is discolored: for common wheat of Group A not more than 8 %, for common wheat of Group B and Grade 6 – not more than 30 %;

– For wheat of Grade 6 - grains and seeds of other cereal and pulse crops which are not included by the nature of their damage in Grain and Waste impurities in accordance with standards for these plants

**3.5.2** ***Grain impurities:***

– Grains of wheat shrivelled, sprouted, overheated;

– Grains in which the germ is discolored: for durum wheat – all grains, for common wheat of Group A – more than 8 %, for common wheat of Group B and Grade 6 – more than 30 %;

– Grains of wheat broken and eaten by pests irrespective of the stage of their damage;

– Grains of other cereals, which are not included by the nature of their damage in Waste impurities in accordance with standards for these plants;

– For wheat of Grade 6 - grains and seeds of other cereal and pulse crops which are included by the nature of their damage in Grain impurities in accordance with standards for these plants

**3.5.3** ***Waste impurities:***

**-** All matter (the same as harmful impurities components) passing through a sieve with long rounded apertures of 1.0 x 20.0 mm, which should be included in mineral impurities;

From the matter retained by a sieve with long rounded apertures of 1.0 x 20.0 mm:

– Mineral, organic and harmful impurities; spoiled grains of wheat, rye, triticale and barley;

– Fragments of wheat, rye, triticale and barley grains with completely eaten away endosperm.

## 4 TECHNICAL SPECIFICATIONS

**4.1** Common wheat is divided into six Grades (Grades 1-3 – Group A, Grades 4-5 – Group B and Grade 6) based on quality parameters values. Durum wheat is divided into five Grades based on quality parameters values. Corresponding quality requirements for each wheat Grade are included in tables 1 and 2.

Common wheat of Group A to be used in food purpose (mainly for flour-milling and baking industry) and for export. Common wheat of Group B and Grade 6 to be used in food and nonfood purpose and for export. As per customer's requirement other non-class-generating quality parameters (W, sedimentation index, etc.) can be analyzed in accordance with internationally recognized and approved methods.

**Table 1 —** Common wheat quality parameters

| **Parameters** | **Description and limits for Common wheat Groups and Grades** | | | | | |
|---|---|---|---|---|---|---|
| | **A** | | | **B** | | |
| | **1** | **2** | **3** | **4** | **5** | **6** |
| **Natural weight**, g/l, not less than | 760 | 740 | 730 | 710 | 690 | Not limited |
| **Vitreuesness,%,** not less than | 50 | 40 | Not limited | | | |
| **Moisture content,** %, not more than | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| **Grain impurities,** %, not more than | 5.0 | 8.0 | 8.0 | 10.0 | 12.0 | 15.0 |
| In particular: | | | | | | |
| broken grains | 5.0 | 5.0 | 5.0 | In limits for Grain impurities | | |
| grains of cereals | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | In limits for Grain impurities |
| sprouted grains | 2.0 | 3.0 | 3.0 | 4.0 | 4.0 | In limits for Grain impurities |
| **Waste impurities**, %, not more than | 1.0 | 2.0 | 2.0 | 2.0 | 2.0 | 5.0 |
| In particular: | | | | | | |
| mineral impurities, out of which: | 0.3 | 0.5 | 0.5 | 0.5 | 0.5 | 1.0 |
| - pebble, slag, ore | 0.15 | 0.15 | 0.2 | 0.15 | 0.2 | In limits for mineral impurities |
| spoiled grains, out of which: | 0.3 | 0.3 | 0.5 | 0.3 | 0.5 | 1.0 |
| - fusarium affected grains | In limits for spoiled grains | | | | | |
| harmful impurities, out of which: | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.5 |
| - smut and ergot | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.1 |
| - Trichodesma incanum | Not permitted | | | | | |
| - Corn-cockle | In limits for harmful impurities | | | | | |
| - each of any other toxic seeds | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.1 |
| **Smutty grains,** %, not more than | 5.0 | 5.0 | 8.0 | 5.0 | 8.0 | 10.0 |
| **Protein content (on dry matter basis),** %, not less than | 14.0 | 12.5 | 11.0 | 12.5 | 10.5 | Not limited |
| **Wet gluten content,** %, not less than | 28.0 | 23.0 | 18.0 | Not limited | | |
| **Gluten quality:** | | | | | | |
| **group** | I-II | I-II | I-II | Not limited | | |
| **IDK units** | 45-100 | 45-100 | 20-100 | | | |
| **Falling number,** sec, not less than | 220 | 180 | 150 | 150 | 130 | Not limited |

**Table 2** — Durum wheat quality parameters

| Parameters | Description and limits for Durum wheat Grades | | | | |
|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** |
| **Common wheat grains,** %, not more than | 4 | 4 | 8 | 10 | Not limited |
| **Natural weight**, g/l, not less than | 750 | 750 | 730 | 710 | Not limited |
| **Moisture content,** %, not more than | 14.5 | 14.5 | 14.5 | 14.5 | 14.5 |
| **Vitreuesness,%,** not less than | 70 | 60 | 50 | 40 | Not limited |
| **Grain impurities,** %, not more than | 5.0 | 5.0 | 8.0 | 10.0 | 15.0 |
| In particular: | | | | | |
| sprouted grains | 1.0 | 1.0 | 3.0 | 3.0 | In limits for Grain impurities |
| **Waste impurities**, %, not more than | 2.0 | 2.0 | 2.0 | 5.0 | 5.0 |
| In particular: | | | | | |
| mineral impurities, out of which: | 0.3 | 0.3 | 0.5 | 0.5 | 1.0 |
| - pebble, slag, ore | 0.15 | 0.15 | 0.2 | 0.3 | In limits for mineral impurities |
| spoiled grains, out of which: | 0.2 | 0.2 | 0.5 | 1.0 | 1.0 |
| - fusarium affected grains | In limits for spoiled grains | | | | |
| harmful impurities, out of which: | 0.2 | 0.3 | 0.5 | 0.5 | 0.5 |
| - smut and ergot | 0.05 | 0.05 | 0.1 | 0.1 | 0.1 |
| - Trichodesma incanum | Not permitted | | | | |
| - Corn-cockle | In limits for harmful impurities | | | | |
| - each of any other toxic seeds | 0.05 | 0.05 | 0.05 | 0.05 | 0.1 |
| **Smutty grains, %,** not more than | 5.0 | 5.0 | 5.0 | 5.0 | 10.0 |
| **Protein content (on dry matter basis),** %, not less than | 14.0 | 13.0 | 12.0 | 11.0 | Not limited |
| **Falling number,** sec, not less than | 200 | 200 | 150 | 100 | Not limited |

**4.2** Common and Durum wheat of each Grade should be in sound condition, not perspired and without heat damage, with smell intrinsical to sound grain (without musty, malty, moldy, putrid, wormwood, smutty, oil products and other foreign smells); of typical color; grain pests infestation is not permitted.

**4.3** Wheat, which have lost its natural colour as a result of adverse conditions during ripening, harvesting or storage, is classified as "Discoloured" with mentioned Discoloration Level. Discoloration Levels 1-2 are permitted for Common wheat of Groups A and B, and any Discoloration Level – for Grade 6.

**4.4** In case of mismatch even of one parameter to common wheat requirements, common wheat should be transferred into the corresponding Grade. In case of mismatch of gluten quantity and quality parameters to minimal requirements of Group A common wheat should be transferred into group B under condition that other parameters to be in conformity with the quality requirements. In case of mismatch even of one common wheat parameter to Groups A and B requirements common wheat should be transferred into Grade 6.

**4.5** In case of mismatch even of one parameter to durum wheat requirements, durum wheat should be transferred into the corresponding quality Grade.

**4.6** At the consent of grain silos and other subjects of enterprise activity wheat moisture and impurities content suppose to be above the requirements limits, under condition of further

processing of such grain by them to the quality parameters noted in tables 1 and 2.

**4.7** In case of mismatch even of one parameter to minimal requirements of Grade 6 for common wheat and Grade 5 for durum wheat, it should be classified for account as "Non-standard" with mentioned mismatched parameter/parameters.

**4.8** Import and export requirements to wheat quality parameters to be established in the contract between the supplier and the buyer.

**4.9** Pesticides residues content in wheat should not exceed the norms stipulated in MBP&CH 5061 [1] and DSanPiN 8.8.1.2.3.4-000 [2].

**4.10** Radionuclides content in wheat should not exceed levels established in GN 6.6.1.1-130 [3].

**4.11** Poisonous materials content in wheat should not exceed maximum admissible levels noted in table 3.

**Table 3** – Maximum admissible levels of toxic elements, mycotoxines, radionuclides and pesticides content

| Parameter | Norm | Method |
|---|---|---|
| **Toxic elements,** mg/kg: | | |
| Lead | 0.5 | In accordance with GOST 26932 and GOST 30538 |
| Cadmium | 0.1 | In accordance with GOST 26933 and GOST 30538 |
| Arsenic | 0.2 | In accordance with GOST 26930 and GOST 30538 |
| Mercury | 0.03 | In accordance with GOST 26927 and GOST 30538 |
| Copper | 10.0 | In accordance with GOST 26931 and GOST 30538 |
| Zinc | 50.0 | In accordance with GOST 26934 and GOST 30538 |
| **Mycotoxines,** mg/kg | | |
| Aflatoxin $B_1$ | 0.005 | In accordance with MP 2273 [4], MP 4082 [5], DSTU EN 12955 |
| Zearalenone | 1.0 | In accordance with MP 2964 [6] |
| T-2 toxin | 0.1 | In accordance with MP 3184 [7] |
| Deoxynivalenol (Vomitoxin) | 0.5 | In accordance with MP 3940 [8], MU 5177 [9] |
| Ochratoxin A | 0.005 | In accordance with DSTU EN ISO 15141-1, DSTU EN ISO 15141-2 |
| Radionuclides, Bq/kg: | | |
| Strontium-90 | 20 | MU № 5778 [10] |
| Caesium-137 | 50 | MU № 5779 [11] |
| **Pesticides** | The list of pesticides, which content to be controlled in wheat, depends on their use in certain territory and to be approved by the authorities of Ministry of Health and Veterinary Medicine of Ukraine | |

## 5 SAFETY AND ENVIRONMENT PROTECTION REQUIREMENTS

**5.1** Control over the emission of noxious pollutants to the atmosphere is to be exercised according to GOST 17.2.3.02, DSP 201 [12].

**5.2** The environmental protection requirements at grain acceptance, transportation and storage of wheat should be observed in accordance with GOST 12.1.005, requirements laid down in "Rules of Accident Prevention and Industrial Sanitation on Storing and Processing Enterprises

of the Ministry of bread products of the USSR", №99 [13], other normative and legal documents in force.

**5.3** Soil protection against contamination with consumer and production waste is to be performed according to SanPiN 42-128-4690 [14].

## 6 ACCEPTANCE CONTROL RULES

**6.1** Acceptance control rules are in accordance with GOST 13586.3.

Extraneous subjects (stones, pieces of metal, wood, etc.) have been observed during intake, outtake and storage should be withdrawn.

**6.2** Wheat condition, smell, color, vitreuesness, natural weight, moisture, grain and waste impurities content, insects infestation, bug-ridden grains, smutty grains, protein and wet gluten content, wet gluten quality and falling number to be determined in each wheat consignment. Safety parameters to be determined in accumulated consignments.

**6.3** Wheat in which the content of other cereals and pulses is over 15 % from the total grain mass together with impurities, to be accepted as a mixture of wheat with other cultivated plants with its composition mentioned in percents.

**6.4** Control of the toxic elements, mycotoxines, pesticides residues and radiological parameters content is carried out by state structures in accordance with current legislation and determinate order.

**6.5** Periodicity of the toxic elements, mycotoxines, pesticides residues and radiological parameters content control – in accordance with MP 4.4.4-108 [15].

**6.6** If wheat consignment, by results of visual or acceptance control, does not meet specified quality requirements and can not be divided into homogeneous parts, it should be returned.

**6.7** In case of unsatisfactory results of analysis even on one of parameters, re-testing on the double quantity of the samples, drawn from the same wheat consignment, to be provided. Results of re-testing are final and apply to the total consignment.

## 7 METHODS OF QUALITY PARAMETERS DETERMINATION

**7.1** Grain sampling shall be carried out in accordance with DSTU 3355, DSTU ISO 13690, and GOST 13586.3.

**7.2** Odor, color and grain discoloration shall be determined in accordance with GOST 10967.

**7.3** Hectolitre weight shall be determined in accordance with DSTU 4233, DSTU 4234, GOST 10840 (arbitral).

**7.4** Vitreuesness shall be determined in accordance with GOST 10987.

**7.5** Moisture content shall be determined in accordance with DSTU 4117, DSTU GOST 29144, GOST 29143, GOST 13586.5 (arbitral).

**7.6** Grain, waste, harmful impurities, smutty grains and bug-ridden grains content shall be determined in accordance with GOST 30483 and Annexes A and B.

**7.7** Protein content shall be determined in accordance with DSTU 4117, GOST 10846 (arbitral).

**7.8**. Gluten quantity and quality (IDK) shall be determined in accordance with DSTU 4117, DSTU ISO 21415-1, DSTU ISO 21415- 2, GOST 13586.1 (arbitral).

**7.9** Falling number shall be determined in accordance with GOST 30498 (arbitral), GOST 27676.

**7.10** Grains infestation by pests shall be determined in accordance with DSTU ISO 6639-1, DSTU ISO 6639-2, DSTU ISO 6639-3, DSTU ISO 6639-4, GOST 13586.4.

**7.11** Toxic elements, mycotoxines, radionuclides and pesticides content shall be determined in accordance with normative documents listed in Table 3 and in accordance with other methods, approved by the Central Executive Authority in the field of health protection.

Decomposition of sample for toxic elements determination shall be carried out in accordance with GOST 26929.

## 8 TRANSPORTATION AND STORAGE

**8.1** Wheat is transported in bulk using any type of transport means in accordance with the transportation rules requirements to the particular type of transport selected.

**8.2** Transport means should be clean, without any foreign odour. Wheat grain should be protected against precipitations during loading, transportation and unloading.

**8.3.** Wheat is to be placed and stored in clean and dry granaries, which are free from foreign odour and infestation and correspond to operating sanitary rules approved in accordance with established procedure, and storage conditions mentioned in “Instructions on grain, oilseeds, flour and groats storage” [16].

## 9. SUPPLIER’S WARRANTY

Supplier shall guarantee conformance of wheat to requirements of the present standard if storing and transportation conditions are met.

ANNEX A
(normative)

## THE ORDER OF WHEAT TESTING FOR IMPURITIES CONTENT

**A.1** A test portion of 250 g shall be passed for half a minute through the sieve with long rounded apertures of 1.0 x 20.0 mm in accordance with GOST 30483 (3.1.2).

The matter that passing through the sieve shall be weighed and included in mineral impurities.

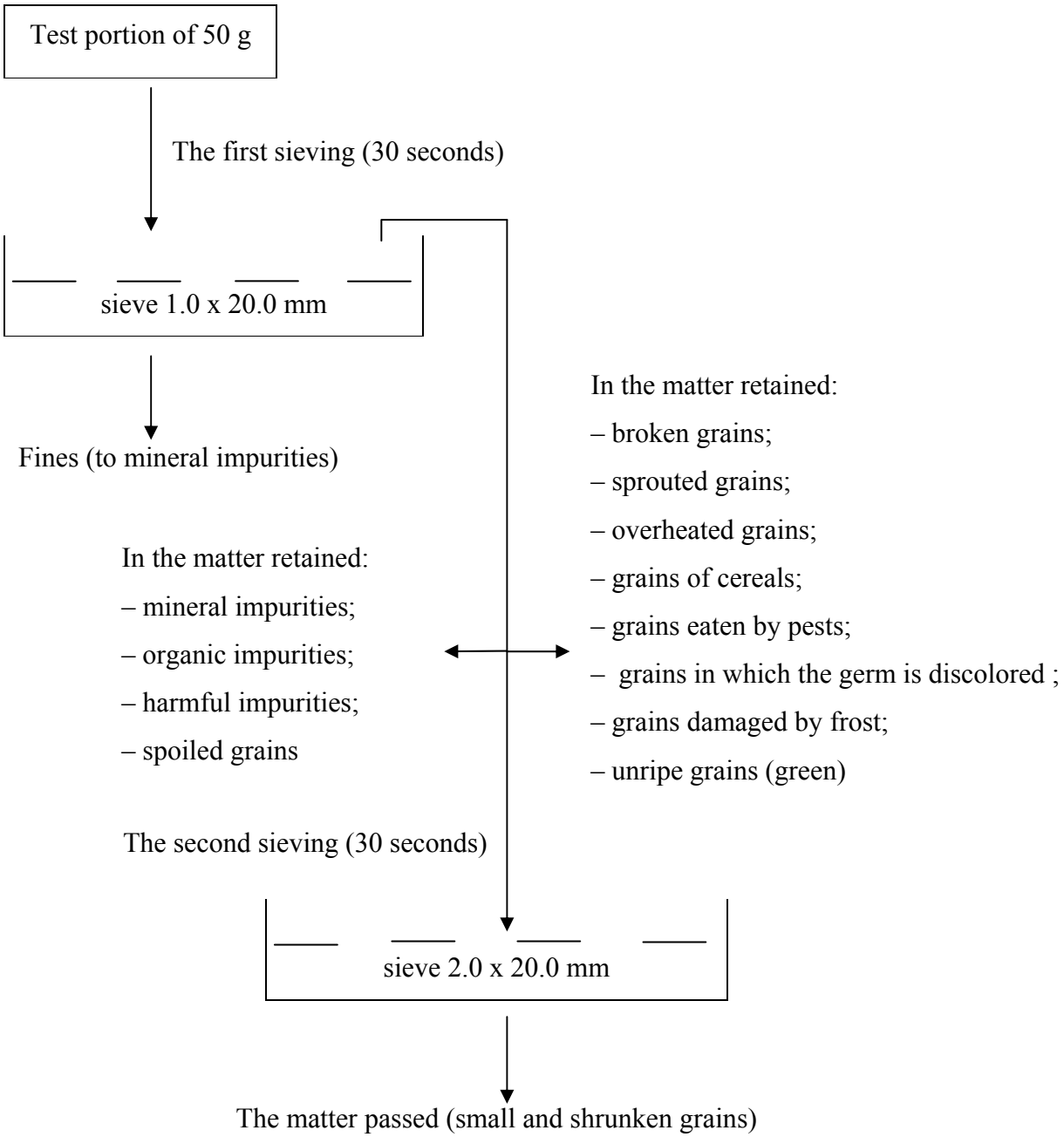
**A.2** Broken grains, overheated grains, grains of cereals, sprouted grains, grains eaten by pests, grains in which the germ is discolored, grains damaged by frost and unripe grains (green), mineral, organic, harmful impurities and spoiled grains must be extracted from the matter retained by the sieve.

**A.3** After elimination from the sample of all the above mentioned matter the partial sample shall be passed for half a minute through a sieve with long rounded apertures of 2.0 x 20.0 mm.

All the matter which passes through the sieve with long rounded apertures of 2.0 x 20.0 mm shall be weighed and considered as small and shrunken grains.

**A.4** Shrivelled grains content shall be determined as sum of grains damaged by frost, unripe grains (green), small and shrunken grains content in percents.

**A.5** Smutty grains and bug-ridden grains shall be determined in accordance with GOST 30483 requirements.



ANNEX B
(normative)

## DETERMINATION OF FUSARIUM AFFECTED GRAINS CONTENT

**B.1 Apparatus:**

**Laboratory balances of accuracy class 3,** maximum weighing limit of 1 kg in accordance with GOST 24104.

**4.5 magnifying glass** in accordance with GOST 25706.

**Laboratory plate** in accordance with the normative document currently in force.

**Scalpel or razor blade** in accordance with the normative document currently in force.

**Scoop** in accordance with the normative document currently in force.

**Laboratory cup for test sample** in accordance with the normative document currently in force.

**B.2 Sampling:**

Sampling is carried out according to GOST 13586.3. An average sample of not less than 2 kg shall be combined from increment samples drawn. A test sample of (50.0 ±0.1) g shall be extracted from the average sample after the coarse waste impurities removal.

**B.3 Determination:**

Grains which exhibit fusarium affect (according to Annex C) shall be removed from the (50.0 ±0.1) g test portion under good lighting conditions. If uncertain grains, which can be classified as Discoloured grains of the Discoloration Level 3 or Pink Non-Fusarium affected grains, are observed, their germ and crease shall be checked for availability of mycelium and sporodochium using the magnifying glass, the germ shall be cut and its colour shall be determined. The grains shall be considered as Fusarium affected grains in case the aggregate characteristics indicated in Annex C are observed. Weigh Fusarium affected grains to the nearest 0.01 g.

**B.4 Processing of the results:**

Content of Fusarium affected grains is expressed in percents, where total weight of the Fusarium damaged kernels detected in test sample of 50 g is multiplied by 2. In case the third decimal digit is 5 or more, the second decimal digit shall be increased by one.

**B.5 Control of the results:**

Discrepancy between results of control determinations' should not exceed mentioned permissible values:

| **Fusarium affected grains content, %** | **Permissible difference between results of control determinations, %** |
|---|---|
| Up to 0.30 inclusive | 0.15 |
| Over 0.30 up to 0.60 inclusive | 0.25 |
| » 0.60 » 1.00 » | 0.35 |
| » 1.00 » 3.00 » | 0.55 |
| » 3.00 » 6.00 » | 0.85 |
| » 6.00 » 10.00 » | 1.25 |

Annex C
(normative)

## EXTERNAL CHARACTERISTICS OF FUSARIUM AFFECTED WHEAT GRAINS AS WELL AS DISCOLOURED AND PINK NON-FUSARIUM AFFECTED GRAINS

| Characteristics | Fusarium affected grains | Discoloured grains (Discoloration Level 3) | Pink Non-Fusarium affected grains |
|---|---|---|---|
| External appearance | Grain is whitish, chalky, with complete loss of shine. Pink-crimson or cream-pink stains can be observed on some grains | Grain is cream-white with complete or partial loss of shine | On the background of typically colored grain coats there are pink-red stains on the whole surface of grains, mainly near the germ, which cannot be scraped off. Natural shine. |
| Kernel structure | Porous, crumbly endosperm of floury consistency; in case of lingering Fusarium affect – from floury to partially vitreous | Structure of endosperm is similar to typically coloured grain | Vitreuesness of endosperm is the same as in typically coloured grain |
| Form and fullness | Most grains are wrinkled and stunted; with pointed cheeks and dashed in crease. In case lingering Fusarium affect form and size of the crease are similar to that in sound grains, sometimes grains are swollen, with pilled off coats | Not differ from typically coloured grains. Coat may be slightly wrinkled on the back of the grain. | Not differ from typically coloured grains. Pink coloured coat and endosperm are tightly joined. |
| Fungi infection and germ viability | Germ is not viable, black coloured at cut. Fungus mycelium is present on the crease and in the germ | Germ is viable, primrose at cut. No fungus mycelium and sporodochium on the crease and the germ | Germ is viable, primrose at cut. No fungus mycelium and sporodochium on the crease and in the germ |

Annex D
(informative)

## EXTERNAL CHARACTERISTICS OF WHEAT GRAINS IN WHICH THE GERM IS DISCOLORED


Signs of seed coat darkening at the germ area:
1 – The minimum area and intensity of darkening at the germ area (view from above);
2 – The minimum level of coverage by continuous band that extends around the cheek (width and darkening intensity of the band is irrelevant);
3 – The minimum degree of darkening of the continuous band required (amount of the band darkening area is irrelevant).

Grain shall be considered as grains in which the germ is discolored in case of simultaneous presence of sign 1 with sign 2 or with sign 3, which are obligatory.

*Free translation from Ukrainian*
*Translator:* ***O. Onischenko***
*This translation is done within implementation of Canada-Ukraine Grain Project «Grain Quality and Rural Agriculture Credit Systems in Ukraine – Phase 2»*

Annex E
(informative)

## INDICATIVE LIST OF HARMFUL AND TOXIC SEEDS

| Botanical name | Common name in Ukrainian | Common name in English |
|---|---|---|
| **Toxic seeds** | | |
| Acroptilon repens (L.) DC. | Гірчак повзучий | Hardheads, Russian Knapweed |
| Agrostemma githago L. | Кукіль звичайний | Corn-cockle |
| Conium maculatum L. | Болиголов плямистий | Spotted hemlock |
| Coronilla varia L. | В'язіль різнокольоровий | Coronilla, Crown vetch |
| Crotalaria spp. | Кроталярія | Crotalaria |
| Datura fastuosa L. | Дурман індійський | Downy thorn-apple, hoary thorn-apple |
| Datura stramonium L. | Дурман звичайний | Stramony, Thorn apple |
| Heliotropium lasiocarpum Fisher et C. A. Meyer | Геліотроп опушеноплідний | Heliotrope |
| Lolium temulentum L. | Пажитниця п'янка | Darnel |
| Ricinus communis L. | Рицина звичайна | Castor-oil plant |
| Sophora alopecuroides L. | Софора лисохвоста | Stagger bush, Russian centaury |
| Sophora pachycarpa Schrank ex C. A. Meyer | Софора товстоплідна | Siberian Pachycarpa |
| Thermopsis montana | Термопсис гірський | Buffalo pen |
| Thermopsis lanceolata R. Br. in Aiton | Термопсис ланцетоподібний, мишатник | False Lupin, Golden Banner |
| Trichodesma incanum | Триходесма сива | |
| **Harmful seeds** | | |
| Allium sativum L. | Часник | Garlic |
| Cephalaria syriaca (L.) Roemer et Shultes | Ворсянка, цефалярія сірійська | Teasel |
| Melampyrum arvense L. | Мар'янник польовий | Cow-cockle |
| Melilotus spp. | Донник | Melilot,Sweet clover |
| Sorghum halepense (L.) Pers. | Сорго алепське | Johnson grass |
| Trigonella foenum-graecum L. | Пажитник сінний | Fenugreek |

Annex F
(informative)

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