

9. Mixed grain

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Composition of Mixed Grain

Mixed grain consists of any mixture of wheat, rye, barley, oats, triticale, wild oats and domestic or wild oat groats which is excluded from other established grades on account of such mixtures.

Determination of commercially clean

Dockage is not assessed on mixed grain samples that meet the commercially clean specifications defined in the commercially clean determination table. The table is found in the export shipments section of this chapter. All samples must be analyzed to determine if they are commercially clean prior to dockage assessment. The analysis of samples which are clearly not commercially clean may consist of a visual assessment. For example, if there is no doubt that a sample contains more than 0.1% of small seeds without hand sieving and weighing the seeds then dockage will be assessed using the procedure defined under **Determination of dockage**. Where there is any doubt regarding whether the sample is commercially clean the sample must be analyzed using the procedure outlined in steps 1 through 5 below to confirm that the sample is not commercially clean prior to assessing dockage.

1. Using a Boerner-type divider, divide the sample to obtain a representative portion.
 - Official samples shall be at least 1 kg.
 - Unofficial samples shall be at least 1 kg.
2. Place approximately 250 grams of the sample at a time on the No. 4.5 round-hole hand sieve.
3. Move the sieves from left to right 30 times using a sifting motion. One complete motion is approximately 10 cm from the center to one side, back to the center, approximately 10 cm to the other side and back to the center.
4. All material passing through the No. 4.5 round-hole sieve is weighed and the percentage calculated to determine if it meets the commercially clean specification of the grade for material removable through the No. 4.5 round hole sieve. (Column #2 in the commercially clean determination table)
5. Small seeds passing through the No. 4.5 round hole sieve are weighed and the percentage calculated to determine if they meet the commercially clean specification of the grade for small seeds. (Column #1 in the commercially clean determination table)

Should the percentage concentration of either of the factors determined in steps 1 through 5 exceed the specifications set out in columns 1 or 2 of the commercially clean determination table the sample will be considered to be not commercial clean. Dockage will be assessed on samples determined to be not commercially clean by using the procedure defined under **Determination of dockage**.

Determination of dockage

- ▲ **Important:** When a sample is to be graded as mixed grain, return dockage to the cleaned sample, and begin the **Normal cleaning procedure** described in this section.

Definitions

Dockage is assessed and recorded to the nearest 0.1%.

Dockage is defined under the *Canada Grain Act* as “any material intermixed with a parcel of grain, other than kernels of grain of a standard of quality fixed by or under this Act for a grade of that grain, that must and can be separated from the parcel of grain before that grade can be assigned to the grain”. Dockage is removed by following the cleaning procedure described in this chapter.

The sample as it arrives is referred to as the uncleaned or dirty sample. Its weight is the gross weight of the sample. Dockage is assessed on the gross weight of the sample.

Dockage is assessed in two stages.

1. Follow the **Normal cleaning procedure**, using the Carter dockage tester.
2. Follow the procedure for **Cleaning for grade improvement**. This cleaning can be done at any time after the cleaning assessment has been completed.

Dockage not reported

- ▲ **Important:** Dockage is not reported for
- Mixed Grain, Sample CW/CE Account Fireburnt
 - Mixed Grain, Sample Salvage
 - Mixed Grain, Sample Condemned
 - Unofficial samples declared as processed

Normal cleaning procedure

1. Set up the Carter dockage tester as follows:

Feed control	# 6
Air control	Minimum # 4
Riddle	No. 6
Top sieve	No. 6 buckwheat
Centre sieve	No. 5 buckwheat
Bottom sieve	No. 4.5 round-hole
Sieve cleaner control	Off

2. Using a Boerner-type divider, divide the uncleaned sample to obtain a representative portion.
 - Official samples shall be at least 1 kg.
 - Unofficial samples shall be at least 1 kg.
3. Turn on the Carter dockage tester.

4. Pour the sample into the hopper.
5. After the sample has passed through the machine, turn on the sieve cleaner control for two to three seconds to remove kernels lodged in the sieve.
6. Turn off the dockage tester.
7. Lightly snap the retainer rod of the aspiration pan to loosen material gathered on the air screen.
8. Remove the aspiration pan.
9. Determine dockage, using the list under **Composition of dockage**.

Composition of dockage

Dockage includes

- Material handpicked or removed over the No. 6 riddle
- Lightweight material removed by aspiration
- Material that passes through the No. 4.5 round-hole sieve
- Material such as large seeds removed by the No. 5 buckwheat sieve in excess of the grade tolerance for total foreign material (TFM)
- Soft earth pellets (SEP), up to a maximum of 10% of the gross weight of the sample, handpicked from the clean sample
- Material removed by **Cleaning for grade improvement**

Cleaning for grade improvement

If the grade of a sample can be improved by additional cleaning, perform the cleaning and add the additional material to dockage. Cleaning for grade improvement can be done at any time after the cleaning assessment has been completed, including on export.

1. After the cleaning assessment has been completed, sieve the sample, using the No. 6 buckwheat hand sieve.
 - ▲ **Important:** When using a hand sieve, move the sieve from left to right 30 times, in a steady motion. One complete motion is approximately 10 cm from the center to one side, back to the center, approximately 10 cm to the other side and back to the center.
2. Weigh the additional dockage and add it to the original dockage.

Cleaning for grade improvement—Mixed grain

Material to be removed	Equipment	Effect on composition of dockage
Large seeds	No. 6 buckwheat hand sieve	Large seeds are seeds that pass through the No. 6 buckwheat sieve. Add them to dockage.
Stones	No. 6 buckwheat hand sieve	Add all stones that pass through the No. 6 buckwheat sieve to dockage.

Optional analysis

Where a shipper requests special cleaning of a carlot of grain at a terminal elevator, and the elevator manager agrees, dockage material will be analyzed for the presence of grain. The percentage and grade of any grain contained in the dockage will be reported.

Procedure

1. Analyze the official sample.
2. Record the following on inspection records:
 - The percentage by gross weight to the nearest 0.1% and the grade of mixed grain.
 - The percentage by gross weight to the nearest 0.1% and the grade of grain separable from dockage.
 - The percentage of dockage.

Example:

95.0% Mixed Grain Canada Western Wheat

4.0% Domestic Mustard Seed, No. 1 Canada Oriental

1.0% dockage

Grading

Important definitions

Net weight of sample

The sample after cleaning and removal of dockage is referred to as the cleaned sample. Its weight is the net weight of the sample. For grading, percentages by weight refer to percentages of the net weight.

Hazardous substances in samples

Wear gloves and a mask to handle any samples that you suspect may contain hazardous substances. Hazardous substances are defined in section 1 of the *Canada Grain Regulations* as “any pesticide, desiccant or inoculant”.

Processed sample

An unofficial sample of grain declared to be conditioned or cleaned to meet end user specifications, and whereas, the determination of dockage and/or determination of commercially clean are not performed or reported.

Rounding rules

Rounding rules are outlined in [schedule 3 of the *Canada Grain Regulations*](#). When official inspection results are expressed numerically, they should be expressed to the same decimal precision as the applicable tolerance in the primary and export grade determination tables.

Representative portion for grading

All grading is done on representative portions divided down from the clean sample, using a Boerner-type divider.

The optimum representative portion is the representative sample size within the minimum and maximum range used to obtain the most accurate result when assessing an objective factor. It is determined by taking into consideration the tolerance and concentration of the objective factor being assessed.

Representative portion of mixed grain for grading (in grams)

Grading factor	Sample portion size range	
	Minimum	Maximum
Broken	25 g	50 g
Ergot	500 g	working sample
Excreta	working sample	working sample
Fertilizer pellets	working sample	working sample
Fireburnt	working sample	working sample
Fusarium damage	25 g	100 g
Heated	25 g	100 g
Large seeds	100 g	250 g
Odour	working sample	working sample
Sclerotinia sclerotiorum	500 g	working sample
Soft earth pellets	working sample	working sample
Stones	working sample	working sample
Treated seed	working sample	working sample

Grading factors

Broken (BKN)

Broken kernels are pieces of grain that are less than three-quarters of a whole kernel.

Contaminated grain (CONTAM GRN)

▲ **Important:** Wear gloves and a mask to handle any sample that is suspected of containing contaminated grain.

Grain is contaminated for the purposes of the *Canada Grain Act* if the grain contains any substance in sufficient quantity that the grain is either

- (a) adulterated for the purposes of the *Food and Drugs Act*; or
- (b) contaminated within the meaning of the regulations made under section 51 of the *Safe Foods for Canadians Act*.

Treated seed

Treated seed is grain that has been adulterated with an agricultural chemical for agronomic purposes. The types of agricultural chemicals used to treat seed include pesticides, fungicides and inoculants. These seed dressings contain a dye to render the treated seed visually conspicuous. The colour of the dye varies depending upon the type of treatment and the type of grain. The current Canadian colour standard for pesticide and fungicide seed treatments for cereal (including corn) is red or pink. The colour standard for pesticide and fungicide seed treatments for canola is blue; however, green has also been used. Pulse crop (including soybeans) pesticide and fungicide seed treatments are typically blue or green. The coatings or stains may appear greasy or powdery and the surface area covered may range from tiny flecks to complete coverage.

Other chemical substances

Other chemical substances refers to any chemical residues either adhering to the kernel or remaining in the sample and to samples having a chemical odour of any kind.

Extraneous material

Can be defined as glass, metal, wood (including wood pellets), plastic or any other material not already defined in the Official Grain Grading Guide.

Procedure

If a sample is suspected of being coated with a pesticide, desiccant, inoculant or if the sample contains evidence of extraneous material, including any foreign chemical substance other than fertilizer pellets (FERT PLTS), the sample shall be graded 'Mixed grain, Held IP Suspect Contaminated Grain' and submitted to the Canadian Grain Commission. Determination as to whether grain is contaminated will be made by the Grain Research Laboratory in consultation with the Chief Grain Inspector for Canada. Samples deemed to be contaminated are graded 'Mixed grain, Sample Condemned'.

Earth pellets (EP)

- Hard earth pellets are pellets that do not crumble under light pressure.
See **Stones (STNS)**.
- Soft earth pellets are pellets that crumble under light pressure.
See **Soft earth pellets (SEP)**.

Ergot (ERG)

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

Procedure

- Determine the weight of ergot as a percentage of the net weight of the sample.

Excreta (EXCR)

Excrement from any animal including mammals, birds and insects.

▲ **Important:** Wear gloves and a mask to handle any samples that you suspect may contain excreta.

Extraneous material

See **Contaminated grain (CONTAM GRN)**

Fertilizer pellets (FERT PLTS)

Fertilizer pellets are a manufactured plant nutrient product used by producers in the production of grain. They are typically small, round or irregular shaped and usually white, grey, brown, pink or reddish in colour.

Procedure

- Handpick any fertilizer pellets and determine the concentration in the net working sample.
- Fertilizer pellets are assessed as stones (STNS) when the concentration does not exceed 1.0% of the net sample weight.
- Samples containing fertilizer pellets in excess of 1.0% of the net sample weight are graded 'Mixed Grain, Held IP Suspect Contaminated Grain'. The sample should be submitted to the Canadian Grain Commission. Determination as to whether grain is contaminated will be made by the Grain Research Laboratory in consultation with the Chief Grain Inspector for Canada. Samples deemed to be contaminated are graded 'Mixed Grain, Sample Condemned'.

Fireburnt (FBNT)

Fireburnt kernels are 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.

Heated (HTD)

Heated kernels have the colour and odour typical of grain that has heated in storage or has been damaged by artificial drying, but not charred kernels. Heated includes all heated seeds in the sample.

Large seeds (LSDS)

Large seeds are seeds that do not pass through the No. 4.5 round-hole sieve and grains other than cereal grains, such as peas, beans, corn, flaxseed and domestic buckwheat. Large seeds remaining in the sample are included in total foreign material (TFM).

Odour (HTD)

There is no numeric tolerance for odour. Consider

- The basic quality of the sample
- The type and degree of the odour
- The presence of visible residue causing the odour

If odour is the grade determinant and there is . . .	Then the grade is
A distinct objectionable odour not associated with the quality of the grain, but not heated or fireburnt	Mixed grain, Sample CW/CE, Account Odour
A distinct heated odour	Mixed grain, Sample CW/CE, Account Heated
A distinct fireburnt odour	Mixed grain, Sample CW/CE, Account Fireburnt

Sclerotinia sclerotiorum (SCL)

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

Soft earth pellets (SEP)

Soft earth pellets are

- Earth pellets that crumble into fine dust under light pressure using a finger only—if they do not crumble, they are considered stones (STNS).
- Any non-toxic material of similar consistency

Procedure

1. Handpick soft earth pellets from a representative portion of the cleaned sample.
2. Soft earth pellets constituting 10% or less of the sample are assessed as dockage.
3. Where soft earth pellets represent more than 10% of the net weight, the sample is graded 'Mixed Grain, Sample CW/CE Account Admixture'.

Stones (STNS)

Stones are hard shale, coal, hard earth pellets, and any other nontoxic materials of similar consistency. Fertilizer pellets are assessed as stones when constituting 1.0% or less of the net sample weight. See **Fertilizer pellets (FERT PLTS)** for the specific procedure to be followed when samples contain fertilizer pellets.

Procedure

1. Handpick stones from a representative portion of the cleaned sample.
2. Determine stone concentration in the net sample.

Note: Stones may be removed and included in dockage if the material removed is 5.0% or less of the gross weight of the sample. See **Cleaning for grade improvement**.

- Samples of grain grown in western Canada containing stones in excess of basic grade tolerances, up to 2.5%, are graded 'Mixed Grain, Rejected (basic grade) Account Stones'. The 'basic grade' refers to a grade established in the *Canada Grain Regulations* (grades listed in the first column in grade determination tables) that would have been assigned to the sample if it contained no stones.
- Samples of grain grown in eastern Canada containing stones in excess of grade tolerances are degraded to lower grades. Samples containing stones in excess of the tolerance of the lowest grade established by regulation, up to 2.5%, are graded 'Mixed Grain, Sample CE Account Stones'.
- Samples of western and eastern Canadian grain containing more than 2.5% stones are graded 'Mixed Grain, Sample Salvage'.

Examples: Western Canada

Excerpt from grade determination tables for
Mixed Grain, Canada Western (CW)

Grade name	Stones %
Mixed Grain CW Wheat	0.1
Mixed Grain CW Rye	0.1
Mixed Grain CW Barley	0.1
Mixed Grain CW Oats	0.1
Mixed Grain CW Triticale	0.1
Mixed Grain CW	0.1

Basic grade:..... Mixed Grain, CW Wheat

If the above sample contained	Grade in western Canada
0.2% stones	Mixed Grain, Rejected CW Wheat Account Stones
1.0% stones	Mixed Grain, Rejected CW Wheat Account Stones
3.0% stones	Mixed Grain, Sample Salvage

Examples: Eastern Canada

Excerpt from grade determination tables for
Mixed Grain, Canada Eastern (CE)

Grade name	Stones %
Mixed Grain CE Wheat	0.1
Mixed Grain CE Rye	0.1
Mixed Grain CE Barley	0.1
Mixed Grain CE Oats	0.1
Mixed Grain CE Triticale	0.1
Mixed Grain CE	0.1

Basic grade:..... Mixed Grain, CE Wheat

If the above sample contained	Grade in eastern Canada
0.2% stones	Mixed Grain, Sample CE Account Stones
1.0% stones	Mixed Grain, Sample CE Account Stones
3.0% stones	Mixed Grain, Sample Salvage

Treated seed and other chemical substances

See Contaminated grain (CONTAM GRN).

Primary and export grade determination tables

Mixed Grain, Canada Western (CW), composition

Grading factor	Mixed Grain CW Wheat	Mixed Grain CW Rye	Mixed Grain CW Barley	Mixed Grain CW Oats	Mixed Grain CW Triticale	Mixed Grain CW
** Composition	Mixtures of cereal grains and wild oats, containing greater than 50% wheat	Mixtures of cereal grains and wild oats, containing greater than 50% rye	Mixtures of cereal grains and wild oats, containing greater than 50% barley	Mixtures of cereal grains and wild oats, containing greater than 50% oats	Mixtures of cereal grains and wild oats, containing greater than 50% triticale	Mixtures of cereal grains and wild oats, no single cereal grain exceeding 50% but containing 50% or greater of total cereal grains

*All grades must have less than 50% by weight of wild oats

Mixed Grain, Canada Western (CW), damage

Grading factor	Mixed Grain CW Wheat	Mixed Grain CW Rye	Mixed Grain CW Barley	Mixed Grain CW Oats	Mixed Grain CW Triticale	Mixed Grain CW	Grade, if specs for Mixed Grain not met
Broken %	20	20	20	20	20	20	50% or less—Sample Feed Grain Over 50%—Sample Broken Grain
Fireburnt %	0.5	0.5	0.5	0.5	0.5	0.5	Mixed Grain, Sample CW Account Fireburnt
Heated %	10	10	10	10	10	10	Mixed Grain, Sample CW Account Heated

Mixed Grain, Canada Western (CW), foreign material

Grading factor	Mixed Grain CW Wheat	Mixed Grain CW Rye	Mixed Grain CW Barley	Mixed Grain CW Oats	Mixed Grain CW Triticale	Mixed Grain CW	Grade, if specs for Mixed Grain not met
Ergot %	0.10	0.10	0.10	0.10	0.10	0.10	Mixed Grain, Sample CW Account Ergot
Excreta %	0.02	0.02	0.02	0.02	0.02	0.02	Mixed Grain, Sample CW Account Excreta
Sclerotinia %	0.25	0.25	0.25	0.25	0.25	0.25	Mixed Grain, Sample CW Account Admixture
Stones %	0.1	0.1	0.1	0.1	0.1	0.1	2.5% or less— Mixed Grain, Rejected (grade) Account Stones Over 2.5%— Mixed Grain, Sample Salvage
Total % Foreign material	2	2	2	2	2	2	Mixed Grain, Sample CW Account Admixture

Mixed Grain, Canada Eastern (CE), composition

Grading factor	Mixed Grain CE Wheat	Mixed Grain CE Rye	Mixed Grain CE Barley	Mixed Grain CE Oats	Mixed Grain CE Triticale	Mixed Grain CE
** Composition	Mixtures of cereal grains and wild oats, containing greater than 50% wheat	Mixtures of cereal grains and wild oats, containing greater than 50% rye	Mixtures of cereal grains and wild oats, containing greater than 50% barley	Mixtures of cereal grains and wild oats, containing greater than 50% oats	Mixtures of cereal grains and wild oats, containing greater than 50% triticale	Mixtures of cereal grains and wild oats, no single cereal grain exceeding 50% but containing 50% or greater of total cereal grains

*All grades must have less than 50% by weight of wild oats

Mixed Grain, Canada Eastern (CE), damage

Grading factor	Mixed Grain CE Wheat	Mixed Grain CE Rye	Mixed Grain CE Barley	Mixed Grain CE Oats	Mixed Grain CE Triticale	Mixed Grain CE	Grade, if specs for Mixed Grain not met
Broken %	20	20	20	20	20	20	50% or less—Sample Feed Grain Over 50%—Sample Broken Grain
Fireburnt %	0.5	0.5	0.5	0.5	0.5	0.5	Mixed Grain, Sample CE Account Fireburnt
Heated %	10	10	10	10	10	10	Mixed Grain, Sample CE Account Heated

Mixed Grain, Canada Eastern (CE), foreign material

Grading factor	Mixed Grain CE Wheat	Mixed Grain CE Rye	Mixed Grain CE Barley	Mixed Grain CE Oats	Mixed Grain CE Triticale	Mixed Grain CE	Grade, if specs for Mixed Grain not met
Ergot %	0.25	0.25	0.25	0.25	0.25	0.25	Mixed Grain, Sample CE Account Ergot
Excreta %	0.02	0.02	0.02	0.02	0.02	0.02	Mixed Grain, Sample CE Account Excreta
Sclerotinia %	0.25	0.25	0.25	0.25	0.25	0.25	Mixed Grain, Sample CE Account Admixture
Stones %	0.1	0.1	0.1	0.1	0.1	0.1	2.5% or less— Mixed Grain, Sample CE Account Stones Over 2.5%— Mixed Grain, Sample Salvage
Total % Foreign material	2	2	2	2	2	2	Mixed Grain, Sample CE Account Admixture

Export shipments

Export shipments can be commercially clean or not commercially clean. Dockage is not reported for commercially clean shipments

Commercially clean (CCLN)

Export shipments are defined as commercially clean when meeting the commercially clean specifications listed in the table below upon following the **Determination of commercially clean** procedure described in this chapter.

No dockage is reported for samples representing commercially clean mixed grain.

Commercially clean determination table, mixed grain

Grade name	Material through #4.5 round-hole sieve	
	(1) Small seeds %	(2) Total %
Mixed Grain CW/CE Wheat	0.1	0.2
Mixed Grain CW/CE Rye	0.1	0.2
Mixed Grain CW/CE Barley	0.1	0.2
Mixed Grain CW/CE Oats	0.1	0.2
Mixed Grain CW/CE Triticale	0.1	0.2
Mixed Grain CW/CE	0.1	0.2

Not commercially clean (NCC)

Export shipments that do not meet the standards for commercial cleanliness are referred to as not commercially clean. Such shipments are allowed only with the permission of the Canadian Grain Commission.

For samples representing not commercially clean shipments approved by the Canadian Grain Commission for shipment from terminal elevators, dockage is reported to the nearest 0.1%.

A deduction of up to 0.2% is applied to take into account the buildup of attritional material for direct exports only.

Grading

Mixed grain on export is graded in accordance with the primary and export grade determination tables. The composition of samples is shown on all records and certificates.