Canadian Grain Commission | Commission canadienne des grains

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Official Grain Grading Guide

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5. Rye

Determination of commercially clean

Dockage is not assessed on rye sample that meet the commercially clean specifications defined in the rye export grade determinant table. 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 0.05% of small seeds without hand sieving and weighing the seeds then dockage will be assessed using procedures defined under *Determination of dockage.* Where there is any doubt regarding whether the sample is commercially clean the sample must be analyzed using the procedures outlined in steps 1 through 5 below to confirm that the sample is not commercially clean prior to assessing a dockage.

1. Using a Boerner-type divider, divide the sample to obtain a representative portion.
    - Official samples should be at least 900 grams.
    - Unofficial samples should be at least 750 grams.
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 rye export grade determinant 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 rye export grade determinant 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 rye export grade determinant chart 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 procedures defined under *Determination of dockage.*

Determination of dockage

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

Dockage not reported

▲ **Important:** Dockage is not reported for samples grading

- *Rye, Sample CW/CE Account Fireburnt*
- *Rye, Sample Salvage*
- *Rye, Sample Condemned*

Normal cleaning procedures

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

1. Set up the Carter dockage tester as follows:

Feed control	#5
Air control	Minimum #4
Riddle	No. 25 or No. 1
Top sieve	No. 6 buckwheat
Centre sieve	No. 5 buckwheat
Bottom sieve	No 5 buckwheat
Sieve cleaner control	Off

2. Using a Boerner-type divider, divide the uncleaned sample to obtain a representative portion.
   - Official samples should be at least 900 grams.
   - Unofficial samples should be at least 750 grams.
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. Handpick large whole kernels of rye from the portion passing over the riddle and return them to the cleaned sample.
10. Determine dockage. Use the list under *Composition of dockage*.

Composition of dockage

Dockage includes

- Rye with long rootlets removed by the riddle.
- For samples of rye which are graded *Rye Sample CW/CE Account Sprouted* any rye with long rootlets that was removed by the riddle will be returned to the sample and not assessed as dockage (See *Sprouted)*
- Material other than rye removed by the No. 25 riddle
- Material removed by aspiration
- Material that passes through the bottom No. 5 buckwheat Carter sieve
- A maximum of 10% soft earth pellets 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 normal cleaning.

Procedures are summarized in the table which follows.

1. Sieve the sample using the No. 6 buckwheat hand sieve.

   ▲ **Important:** When you use a hand sieve, move the sieve from left to right 30 times, using a sifting motion. One time is one complete motion from the centre, to one side, to the other side, and back to the centre. The total distance from left to right is 20 cm, about eight inches.

2. Weigh the additional dockage and add it to the original dockage.

Cleaning for grade improvement—Rye

Material to be removed	Equipment	Effect on composition of dockage
Broken kernels	No. 6 buckwheat hand sieve	If the weight of broken kernels is over the grade tolerance but is • Less than 5% of the gross weight, add to dockage • 5% or more of the gross weight, broken kernels become a grading factor. Return them to the cleaned sample. See *Broken kernels*

Optional analysis

Where a shipper requests special cleaning of a carlot of grain at a terminal or transfer 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 and elevator stocks will be adjusted on the basis of the analysis.

Agreement of the shipper and unload elevator must be conveyed to the CGC in writing prior to the analysis being performed.

Procedures

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 rye.
   - 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% Rye, No. l CW
   4. 0% Domestic Mustard Seed, No. 1 CAN 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. Percentages by weight for grading refer to percentages of the cleaned sample, or the net weight.

Kernel counts (K)

The kernel count is the number of kernel-sized pieces in 500 gram sample.

- To do kernel counts, you must have 500 grams of cleaned sample.
- All grading is done on representative portions divided down from the cleaned sample using a Boerner-type divider.

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 the Regulations as "any pesticide, herbicide or desiccant."

Representative portion for grading

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

When concentration of the grading factor is ...	Then use ...
Low	Optimum portion size
High	Minimum portion size or more (do not use less)

Values in this table represent a range of recommended portion sizes.

Representative portion of rye for grading, grams

Grading factor	Minimum	Optimum	Export
Broken	50	100	100
Ergot	500	1000	1000
Excreta	working sample	working sample	working sample
Fireburnt	500	working sample	working sample
Fusarium damage	10	100	100
Heated	50	100	100
Matter other than cereal grains	50	100	250
Odour	working sample	working sample	working sample
Other cereal grains, excluding wheat	50	100	250
Sclerotinia sclerotiorum	500	1000	1000
Smudge	working sample	working sample	working sample
Soft earth pellets	working sample	working sample	working sample
Sprouted	10	50	50
Stones	250	1000	1000
Wheat	50	100	250

Grading factors

Broken (BKN)

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

- If the broken kernel has been chewed by insects, it is also considered as broken for grading purposes as long as no mould is evident on the exposed endosperm.
- If the broken kernel has mould on exposed endosperm, it is graded relative to the degree of soundness.

Representative portion for analysis

Minimum—50 g Optimum—100 g Export—100 g

Procedures

- In samples graded *Rye, Sample CW/CE Account Broken* or *Rye, Sample Broken Grain,* handpick any broken rye removed in cleaning but remaining on top of the No. 4.5 round-hole hand sieve. Return it to the cleaned sample.
- For reporting and grading, round down the percentage by weight of broken rye in the cleaned sample to a whole number; for example, 4.9% becomes 4%.

Contaminated grain

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

Contaminated is defined in the "*Canada Grain Act*" as; "Contaminated means, in respect of grain, containing any substance in sufficient quantity that the grain is unfit for consumption by persons or animals or is adulterated within the meaning of the regulations made pursuant to sections B.01.046(1), B.15.001 and B.15.002(1) of the Food and Drugs Act."

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 *Rye, Sample Condemned*.

Degermed kernels (DGM)

Degermed kernels

- Are considered *Sprouted* if the sample contains other sprouted kernels
- Are considered sound if the sample contains no other sprouted kernels

Earth pellets (EP)

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

Ergot (ERG)

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

Representative portion for analysis

Minimum—500 g	Optimum—1000 g	Export—1000 g

Procedures

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

Excreta (EXCR)

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

Representative portion for analysis

Minimum—working sample	Optimum—working sample	Export—working sample

Fertilizer pellets (FERT PLTS)

Fertilizer pellets are typically either small, round and white or irregular shaped and pink or red. Fertilizer pellets are not considered a hazardous substance however there is no visible means of assuring that material resembling fertilizer pellets is not some other contaminant.

Representative portion for analysis

Minimum—working sample	Optimum—working sample	Export—working sample

Procedures

- Handpick any fertilizer pellets and determine the concentration basis the net working sample.
- Fertilizer pellets are assessed as stones 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 *Rye, Held IP Suspect Contaminated Grain.*

Note: Canadian Grain Commission personnel should refer to ISO national work instruction "*Suspect Contaminated Grain, Handling Procedures*" for procedures to be followed when handling samples containing fertilizer pellets.

Fireburnt kernels (FBNT)

Fireburnt kernels are 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.

Representative portion for analysis

Minimum—500 g	Optimum—working sample	Export—working sample

Foreign material (FM)

Foreign material in rye includes all material other than whole or broken rye that remains in the sample after the removal of dockage.

Fusarium damage (FUS DMG)

Fusarium-damaged kernels in rye are chalk-like in appearance and frequently have a fibrous growth in the kernel crease. Rye has a shallow crease and therefore the fibrous growth is frequently removed during handling.

Representative portion for analysis

Minimum—10 g	Optimum—100 g	Export—100 g

Procedures

Separate all kernels showing any evidence of fusarium damage, including any kernels that have a chalk-like appearance. Apply the following guidelines.

Fusarium-damaged kernels includes

- Chalk-like kernels in combination with a fibrous mould
- Chalk-like kernels without the fibrous mould if the mould is present on other chalk-like kernels in the sample

Do not include

- Chalk-like kernels without the fibrous mould if there are no other chalk-like kernels with mould in the sample

Heated kernels (HTD)

Heated kernels are red or orange, and have the odour typical of grain that has deteriorated in storage or has been damaged by artificial drying. Heated rye is not easily detected because of the natural colour variations that occur in sound rye.

Rotted kernels are included in the tolerance for *Heated*.

Representative portion for analysis

Minimum—50 g	Optimum—100 g	Export—100 g

Matter other than cereal grains (MOTCG)

Matter other than cereal grains includes the following material remaining in the cleaned sample:

- Seeds such as ragweed, Tartary buckwheat, rye grass, wild oats
- Non-cereal domestic grains such as flaxseed, corn, peas, buckwheat or lentils

Representative portion for analysis

Minimum—50 g Optimum—100 g Export—250 g

Odour (ODOR)

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

Representative portion for analysis

Minimum—working sample Optimum—working sample Export—working sample

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	*Rye, Sample CW/CE Account Odour*
A distinct heated odour	*Rye, Sample CW/CE Account Heated*
A distinct fireburnt odour	*Rye, Sample CW/CE Account Fireburnt*

Other cereal grains excluding wheat (OCGXWHT)

Other cereal grains, excluding wheat in rye are barley, triticale, oats and groats, including wild oat groats. For oats, see *Machine separation*. For wheat, see *Wheat*.

Representative portion for analysis

Minimum—50 g Optimum—100 g Export—250 g

Rotted (ROT)

See Heated.

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 course surface texture, vary in exterior color from dark black to gray to white and have a pure white interior.

Representative portion for analysis

Minimum	Optimum	Export
500 g	1000 g	1000 g

Smudge (SM)

Smudge describes the discolouration caused by disease. The dark kernels often found in rye are similar in appearance to wheat kernels which has been affected by blackpoint or smudge.

Representative portion for analysis

Minimum	Optimum	Export
working sample	working sample	working sample

Procedures

When grading, consider the incidence and severity of the discolouration. There is no specific numeric tolerance. This factor is considered under *Degree of soundness,* as defined in the Primary Grade Determinants tables.

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*
- Any non-toxic material of similar consistency

Representative portion for analysis

Minimum	Optimum	Export
working sample	working sample	working sample

Procedures

1. Handpick soft earth pellets from a representative portion of the cleaned sample.
2. Soft earth pellets constituting 10.0% 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 *Rye, Sample CW/CE Account Admixture.*

Sprouted kernels (SPTD)

Sprouted kernels show definite signs of germination.

▲ **Important**: Kernels with long rootlets which clean out over the No. 25 or No. 1 riddle are either

- Included in dockage, as described in *Composition of dockage*
- Returned to the sample and become a grading factor, in samples graded *Rye, Sample CW/CE, Account Sprouted*

Representative portion for analysis

Minimum—10 g Optimum—50 g Export—50 g

Stones (STNS)

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. (See *Fertilizer pellets* for specific procedures to be followed when samples contain fertilizer pellets.)

Representative portion for analysis

Minimum—500 g Optimum—1000 g Export—1000 g

Procedures

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

- In western Canada samples of grain containing stones in excess of "basic grade" tolerances, up to 2.5% are graded *Rye, 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 determinant tables) that would have been assigned to the sample if it contained no stones.
- In eastern Canada samples of grain 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 *Rye, Sample Canada Eastern Account Stones.*
- In western and eastern Canada grain containing more than 2.5% stones is graded *Rye, Sample Salvage.*

Examples: Western Canada

Excerpt from grade determinant tables for

Rye, Canada Western

Grade name	Stones %
No. 1 CW	0.033
No. 2 CW	0.033
No. 3 CW	0.066

Basic grade:..... *Rye, No. 2 CW*
Reason for basic grade:..... Mildew

If the above sample contained	Grade in western Canada
0.05% stones	*Rye, Rejected No. 2 CW Account Stones*
1.0% stones	*Rye, Rejected No. 2 CW Account Stones*
3.0% stones	*Rye, Sample Salvage*

Examples: Eastern Canada

Excerpt from grade determinant tables for

Rye, Canada Eastern

Grade name	Stones
No. 1 CE	3K
No. 2 CE	3K
No. 3 CE	5K

K Number of kernel-sized pieces in 500 g

Basic grade:..... *Rye, No. 2 CE*
Reason for basic grade:..... Mildew

If the above sample contained	Grade in eastern Canada
4K stones	*Rye, No. 3 CE*
10K stones	*Rye, Sample CE Account Stones*
3.0% stones	*Rye, Sample Salvage*

Treated seed and other chemical substances

Treated seed

Treated seed is grain that has been coated with an agricultural chemical for agronomic purposes. 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 standards for pesticide seed treatments are: cereals–pink or red, canola–baby blue or green. Seed treated with an inoculant may have a green stain. The coatings or stains may appear greasy or powdery and surface area distribution ranges 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.

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

Representative portion for analysis

Minimum—working sample	Optimum—working sample	Export—working sample

If a sample is suspected of being coated with a pesticide, desiccant, inoculant or if the sample contains evidence of any foreign chemical substance other than fertilizer pellets, the sample shall be graded *Rye, Held IP Suspect Contaminated Grain*.

Note: Canadian Grain Commission personnel should refer to ISO national work instruction "*Suspect Contaminated Grain, Handling Procedures*" for specific procedures to be followed when handling samples suspected of containing treated seed or other chemical substances

Varieties

Rye is graded without reference to variety.

Wheat (WHT)

Wheat is considered foreign material in rye.

Representative portion for analysis

Minimum—50 g	Optimum—100 g	Export—250 g

Primary grade determinants tables

Rye, Canada Western/Canada Eastern (CW/CE)

	Standard of quality		Damage				
Grade name	Minimum test weight kg/hL (g/0.5 L)	Degree of soundness	Broken %	Fireburnt %	Fusarium %	Heated %	Sprouted %
No. 1 CW/CE	72 (349)	Well matured, practically free from weather-damaged kernels	4	Nil	0.25	0.1	0.5
No. 2 CW/CE	69 (334)	Reasonably well matured, reasonably free from weather-damaged kernels	5	Nil	0.5	0.75	2
No. 3 CW/CE	63 (304)	Excluded from higher grades on account of damaged kernels	8	Nil	1	5	10
Grade, when No. 3 specs not met	*Rye, Sample CW/CE Account Light Weight*		50% or less-*Rye, Sample CW/CE Account Broken Grain* Over 50%-*Sample Broken Grain*	*Rye, Sample CW/CE Account Fireburnt*	*Rye, Sample CWICE Account Fusarium Damage*	*Rye, Sample CWICE Account Heated*	*Rye, Sample CWICE Account Sprouted*

	Foreign material							
Grade name	Cereal grains other than wheat %	Ergot %	Excreta %	Matter other than cereal grains %	Sclerotinia %	Stones %		Total %
						CW	CE	
No. 1 CW/CE	1.5	0.05	0.01	0.5	0.05	0.033	3K	2
No. 2 CW/CE	3	0.20	0.01	1	0.10	0.033	3K	5
No. 3 CW/CE	10	0.33	0.02	2	0.25	0.066	5K	10
Grade, when No. 3 specs not met	See *Mixed grain*	*Rye, Sample CW/CE Account Ergot*	*Rye, Sample CW/CE Account Excreta*	*Rye, Sample CW/CE Account Admixture*	*Rye, Sample CW/CE Account Admixture*	2.5% or less-*Rye, Rejected (grade) Account Stones* Over 2.5%-*Rye, Sample Salvage*	2.5% or less-*Rye, Sample CE Account Stones* Over 2.5%-*Rye, Sample Salvage*	See *Mixed grain*

Export shipments

Export shipments can be commercially clean or not commercially clean.

Commercially clean

Shipments are defined as commercially clean when meeting the commercially clean specifications listed in the export grade determinant table upon following the *Determination of commercially clean* procedures described in this chapter.

No dockage is reported for samples representing commercially clean rye.

Not commercially clean (NCC)

Shipments that do not meet the standards for commercial cleanliness are referred to as not commercially clean. Such shipments are permitted only with the permission of the CGC.

For samples representing not commercially clean shipments approved by the CGC for shipment from terminal and transfer elevators, dockage is reported to the nearest

- 0.1% for samples representing commercially clean shipments loaded from a single terminal or transfer elevator
- 0.01% for composite samples representing shipments loaded from more than one terminal or transfer elevator

less a deduction of up to 0.2% to take into account the buildup of attritional material.

Grading

Rye on export is graded using standard samples and export specifications. Where there are no export specifications, the primary specifications are used.

Export grade determinants tables

Rye, Canada Western (CW)

Grade name	Removable material through 4.5 round-hole sieve		Foreign material									Heated %	Sprouted %
								Mineral matter					
	(1) Small seeds %	(2) Total %	Large seeds %	Wild oats %	Total %	Cereal grains other than wheat %	Ergot %	Stones %	Total mineral matter %	Sclerotinia %	Total foreign material, including wheat %		
No. 1 CW	0.05	0.10	0.10	0.10	0.15	1.5	0.05	0.033	0.066	0.05	2	0.05	0.5
No. 2 CW	0.05	0.10	0.15	0.10	0.20	3	0.20	0.033	0.10	0.10	5	0.35	2
No. 3 CW	0.05	0.10	0.25	0.15	0.25	10	0.33	0.066	0.15	0.25	10	2	10