Canadian Grain Commission | Commission canadienne des grains

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Official Grain Grading Guide

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Quality ● Service ● Innovation

20. Soybeans

Determination of dockage

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 section of the guide.

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.

▲ **Important:** Dockage is not reported for samples graded as
- *Soybeans, Sample Canada (colour) Account Fireburnt*
- *Soybeans, Sample Salvage*
- *Soybeans, Sample Condemned*

Normal cleaning procedures

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

Samples that are commercially clean do not go through the Carter dockage tester.

1. Using a Boerner-type divider, divide the uncleaned sample to obtain a representative portion.
   - Official samples should be at least 900 g.
   - Unofficial samples should be at least 750 g.
2. Sieve the samples over the No. 8 round-hole hand sieve, using approximately 250 g at a time, to remove all readily removable material.
3. Set up the Carter dockage tester as follows:

Feed control	#10
Air control	#7
Riddle	none
Top sieve	blank tray
Centre sieve	none
Bottom sieve	none
Sieve cleaner control	off

4. Turn on the Carter dockage tester.
5. Pour the sample into the hopper.

6. After the sample has passed through the machine, turn off the machine.
7. Lightly snap the retainer rod of the aspiration pan to loosen material gathered on the air screen.
8. Determine dockage, using the list under *Composition of dockage.*

Composition of dockage

- Material passing through the No. 8 round-hole sieve
- Up to 10.0% by weight of soft earth pellets handpicked from the sample
- Stems, pods, hulls, loose soybean seed coats, and coarse vegetable matter removed through aspiration with the Carter dockage tester, or handpicked from the sample.

▲ **Important:** Return all pieces of soybeans or whole soybeans, sclerotinia, ergot, weed seeds or other grains removed by aspiration to the sample where they are assessed as grading factors.

Aspiration is used only as an aid to help speed up the removal of lightweight dockage material from the sample.

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 soybeans.
   - 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% Soybeans, No. 1 CAN, Yellow
   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 net weight.

Kernel counts (K)

- 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 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 portions for grading

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

When the grading factor is . . .	Then use . . .
Normal	Optimum portion size
Severe	Minimum portion size or more (do not use less)

Values in this table represent a range of recommended portions.

Representative portion of soybeans for grading, grams

Grading factor	Minimum	Optimum	Export
Colour	working sample	working sample	working sample
Damage	50	250	250
Downy mildew	100	250	250
Ergot	working sample	working sample	working sample
Excreta	working sample	working sample	working sample
Fireburnt	working sample	working sample	working sample
Foreign material	100	500	500
Heated, mouldy, rancid	50	500	working sample
Immature	50	250	250
Odour	working sample	working sample	working sample
Sclerotinia sclerotiorum	100	working sample	working sample
Soft earth pellets	100	500	working sample
Splits, seed coats	100	500	500
Stained, mottled	working sample	working sample	working sample
Stones	500	500	working sample

Grading factors

Colour (CLR)

Soybeans may be yellow, green, brown or black. Colour is part of the grade name; for example, *Soybeans, No. 1 Canada Yellow*.

Bicoloured or mixed soybeans

- Mixed soybeans are samples containing bicoloured soybeans or soybeans of another colour.
- Bicoloured soybeans are yellow or green soybeans with black or brown pigmented streaks or blotches in the seed coats.

Representative portion for analysis

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

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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*."

Samples deemed to be contaminated by the Grain Research Laboratory in consultation with the Chief Grain Inspector for Canada are graded *Soybeans, Sample Condemned.*

Damage (DMG)

Damaged soybeans include those which are sprouted, frost-damaged, shriveled, ground-damaged, insect damaged, immature, or otherwise unsound.

Representative portion for analysis

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

Downy mildew (DWNY MIL)

Downy mildew is a superficial coating of downy or powdery fungal growth. An individual soybean is considered affected only if all of the fungal growth could be pulled together and the growth covers 50% or more of the surface area of the soybean.

Representative portion for analysis

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

Earth pellets

- 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 fungus bodies with a purplish-black exterior, a purplish-white to off white interior, and a relatively smooth surface texture. Ergot is toxic.

Ergot attacks cereal crops and is not usally present in soybeans, which are a broadleaf crop.

Representative portion for analysis

Minimum—working sample	Optimum—working sample	Export—working 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 *Soybeans, 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 (FBNT)

Fireburnt soybeans are seeds charred or scorched by fire. A cross-section of a fireburnt seed resembles charcoal with numerous air holes. The air holes result in a low weight seed which crumbles easily under pressure.

Representative portion for analysis

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

Procedure

Samples of soybeans containing fireburnt seeds are graded as *Soybeans, Sample Canada Account Fireburnt.*

Foreign material (FM)

Foreign material includes any material other than whole soybeans or split soybeans left in the sample after the removal of dockage.

Representative portion for analysis

Minimum—100 g	Optimum—500 g	Export—500 g

Foreign material other than grain (FMXGRN)

Foreign material other than grain does not include ergot or stones, but does include

- Large weed seeds that did not pass through the No. 8 round-hole sieve
- Soft earth pellets which crumble under light pressure
- Soft fertilizer pellets
- Any other non-toxic material of a similar consistency
- Sclerotinia

Representative portion for analysis

Minimum—100 g	Optimum—500 g	Export—500 g

Frost (FR)

Frost-damaged soybeans, when cut in cross-section, are

- Soybeans whose cotyledons are green or greenish-brown with a glassy wax-like appearance are considered frost-damaged.
- Seeds that are yellow or very pale green are considered sound, even if they are superficially affected by weathering.

Representative portion for analysis

Minimum—50 g	Optimum—500 g	Export—500 g

Heated (HTD)

- Soybeans with a light to dark brown cotyledon when cut in cross section are considered heated.
- Soybeans with a very light tan cotyledon when cut in cross section are considered damaged. See *Damage*.
- Soybeans with light pink seed coats are considered in the overall assessment of colour.

Representative portion for analysis

Minimum—50 g	Optimum—500 g	Export—working Sample

Hulls (HULLS)

See *Seed coats.*

Immature (IM)

Immature damaged soybeans are characterized by a green exterior appearance in conjunction with green discolouration penetrating the cotyledon. Examination of the cotyledons is determined by cutting the soybeans in cross section. For grading purposes, immature damaged soybeans are considered as part of the "Total Damage" grade specification.

Soybeans that are green in appearance and have no discolouration of the cotyledon or just a halo of green around the outside of the cotyledon are to be assessed against the overall colour of the sample.

Representative portion for analysis

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

Mottled kernels

See *Stained and mottled.*

Mouldy (MLDY)

Mouldy soybeans are wrinkled and misshapen, and range in colour from medium to dark brown. Large areas of the affected bean are superficially covered with a grey mould. Mouldy beans often have a spongy texture and usually give off an unpleasant odour. They are included in the tolerance for *Heated.*

Representative portion for analysis

Minimum—50 g	Optimum—500 g	Export—working sample

Mudball soybean

A soybean completely covered with caked-on mud is considered damaged.

Representative portion for analysis

Minimum—100 g Optimum—500 g Export—500 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

Grains grading No. 1 through 3 must have a natural odour. A sample would have to grade No. 4 for Damage before it could have a slight odour associated with low quality soybeans.

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 . . .
If there is a distinct unnatural or objectionable odour not associated with the quality of the grain, but not heated or fireburnt	*Soybean, Sample Canada (colour) Account Odour*
A heated odour	*Soybean, Sample Canada (colour), Heated*
A fireburnt odour	*Soybean, Sample Canada (colour), Fireburnt*

Other grains (OGS)

All grains other than soybeans that remain in the sample after cleaning are considered other grains.

Representative portion for analysis

Minimum—100 g Optimum—500 g Export—500 g

Pokeweed stain

Pokeweed stain is a bright red staining of the soybean seed coat caused by the sap of the pokeweed berry. In some cases, the staining may appear similar to pesticide treated seeds of soybeans.

▲ **Important:** Do not confuse pokeweed stain with pesticide treated seed or contaminated grain.

Rancid

Soybeans in various stages of rancidity are characterized by a deep pink discolouration on the seed coat and varying degrees of discolouration of the cotyledon.

Seeds having a deep pink discolouration on the seed coat are cut and, based upon the extent of discolouration of the cotyledon, assessed as follows:

Discolouration of cotyledon	Assess as
No discolouration of cotyledon to slight discolouration just below seed coat.	Considered in the evaluation of colour.
Pink discolouration of cotyledon greater than just below the seed coat level but not throughout the entire seed.	Considered as *Damage.*
Pink discolouration extends throughout cotyledon.	Considered rancid and included in tolerance for *Heated.*

Representative portion for analysis

Minimum—50 g Optimum—500 g Export—working sample

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. Sclerotinia is included in *Foreign material other than grain* for grade determination.

Representative portion for analysis

Minimum—100 g Optimum—working sample Export—working sample

Seed coats

- In unprocessed samples, loose seed coats are assessed as dockage.
- In commercially clean samples, loose seed coats are assessed as *Splits.*

Shrivelled

If the soybean is shrivelled, small and flat, it has no oil value and is considered *Damaged.*

Representative portion for analysis

Minimum—100 g Optimum—500 g Export—500 g

Soft earth pellets (SEP)

Soft earth pellets are pellets that crumble under light pressure—if they do not crumble, they are considered stones. These pellets can be

- Earth and fertilizer pellets
- Any non-toxic material of similar consistency

Representative portion for analysis

Minimum—100 g Optimum—500 g Export—working sample

Procedure

- Earth pellets may be removed as dockage. See *Normal cleaning procedures*.
- If soft earth pellets are over 10.0% of the gross weight of the sample, they become a grading factor, included in the tolerance for *Foreign material other than grain.*

1. Return the pellets to the sample.
2. Handpick soft earth pellets from a representative portion of the cleaned sample.
3. If soft earth pellets are the grade determinant, grade the sample *Soybeans, Sample Canada (colour, Account Admixture.*

Splits (SPLT)

Splits include split soybeans, broken seeds that are less than three-quarters of the whole seed, and cotyledons that are loosely held together by the seed coat.

Representative portion for analysis

Minimum—100 g Optimum—500 g Export—500 g

Procedure

1. Any slotted hand sieve may be used to help separate splits from the sample.
2. Handpick any small whole soybeans that pass through the sieve and return them to the sample.
3. Handpick the remaining splits in the sample and add them to those removed by sieving.
4. Determine the total percentage by weight of splits.

Sprouted

If a soybean shows evidence of sprouting, it is *Damaged.*

Representative portion for analysis

Minimum—100 g Optimum—500 g Export—500 g

Stained and mottled (STND)

Staining or mottling on the surface is caused by weather, dirt, weed stain, or disease. If the soybeans are not damaged or discoloured internally, they are considered sound. See *Pokeweed stain.*

Limits are visible in the Canada standard samples, and are defined under standard of quality as

Good natural colour .....Canada No. 1
Slightly stained .....Canada No. 2
Stained .....Canada No. 3
Badly stained .....Canada No. 4 or 5

Representative portion for analysis

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

Procedure

Evaluate the stain or mottling according to its effect on the general appearance of the sample.

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—500 g	Export—working sample

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 *Soybeans, 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 *Soybeans, Sample Canada (colour) Account Stones.*
- In western and eastern Canada grain containing more than 2.5% stones is graded *Soybeans, Sample Salvage.*

Examples: Western Canada

Excerpt from grade determinant tables for
Soybeans, Canada

Grade name	Stones
No. 1 Canada	Nil
No. 2 Canada	1K
No. 3 Canada	3K
No. 4 Canada	3K
No. 5 Canada	3K

K Number of kernel-sized pieces in 500 g

Basic grade:..... *Soybeans, No. 2 Canada Yellow*
Reason for basic grade:..... 0.2% Heated

If the above sample contained	Grade in Western Canada
2K stones	*Soybeans, Rejected No. 2 Canada Yellow*
10K stones	*Soybeans, Rejected No. 2 Canada Yellow*
3.0% stones	*Soybeans, Sample Salvage*

Examples: Eastern Canada

Excerpt from grade determinant tables for
Soybeans, Canada

Grade name	Stones
No. 1 Canada	Nil
No. 2 Canada	1K
No. 3 Canada	3K
No. 4 Canada	3K
No. 5 Canada	3K

K Number of kernel-sized pieces in 500 g

Basic grade:..... *Soybeans, No. 2 Canada Yellow*
Reason for basic grade:..... 0.2% Heated

If the above sample contained	Grade in Eastern Canada
0.08% stones	*Soybeans, No. 3 Canada Yellow*
1.0% stones	*Soybeans, Sample Canada Yellow Account Stones*
3.0% stones	*Soybeans, 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 *Soybeans, 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.

▲ **Important:** Do not confuse pesticide treated seed with pokeweed stain, which is similar.

Uniform in size

Samples are considered to be uniform in size when there is no distinct difference in seed size. Use the Standard sample as a guide to determine uniformity.

Representative portion for analysis

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

Variety

Soybeans are graded without reference to variety.

Special analyses

Upon request, samples may be analyzed for other factors. The shipper of the soybeans indicates which factors are to be analyzed and which sieves to use.

Hilum colour (white hilum)

Hilum colour is not a grading factor.

Handpick a representative portion of not less than 100 g of the cleaned sample to determine the percentage by weight of Hilum colour.

Sizing

Analyse a representative portion of not less than 500 g of the cleaned sample. The shipper specifies the sieve size.

Primary and export grade determinants tables

Soybeans, Canada Yellow, Green, Brown, Black or Mixed (CAN)

Grade name	Standard of quality	
	Minimum test weight kg/hL (g/0.5 L)	Degree of soundness
No. 1 Canada	70 (357)	Cool, natural odour, good natural colour
No. 2 Canada	68 (347)	Cool, natural odour, may be slightly stained
No. 3 Canada	66 (337)	Cool, natural odour; may be stained
No. 4 Canada	63 (322)	Cool, may be badly stained
No. 5 Canada	59 (301)	Cool, may be badly stained
Grade, if No. 5 specs not met	*Soybeans, Sample Canada (colour) Account Light Weight*	

Note: The colour is added to the grade name.

Soybeans, Canada Yellow, Green, Brown, Black or Mixed (CAN), continued

Grade name	Damage		Downy mildew	Other colours or bicoloured other than for mixed soybeans	Foreign material				Splits %
	Heat-damaged or moldy %	Total %			Ergot %	Stones %	Foreign material other than grain %	Total %	
No. 1 Canada	Nil	2.0	2	2	0.01	Nil	0.1	1.0	10
No. 2 Canada	0.2	3	10	3	0.025	1K	0.3	2	15
No. 3 Canada	1.0	5	No limit	5	0.1	3K	0.5	3	20
No. 4 Canada	3	8	No limit	10	0.25	3K	2	5	30
No. 5 Canada	5	15	No limit	15	0.25	3K	3	8	40
Grade, if No. 5 specs not met	*Soybeans, Sample Canada (colour) Account Heated or Mouldy*	*Soybeans, Sample Canada (colour) Account Damaged*		Appropriate mixed grade	*Soybeans, Sample Canada (colour) Account Ergot*	2.5% or less—*Soybeans, Rejected (grade) Account Stones*, or *Soybeans, Sample Canada (colour) Account Stones* Over 2.5%—*Soybeans, Sample Salvage*	*Soybeans, Sample Canada (colour) Account Admixture*	*Soybeans, Sample Canada (colour) Account Admixture*	*Soybeans, Sample Canada (colour) Account Splits*

K Number of kernel-sized pieces in 500 g

Note: The colour is added to the grade name.

Export shipments

Shipments can be commercially clean or not commercially clean.

Commercially clean

No dockage is assessed on commercially clean shipments.

Samples are considered commercially clean when the sample contains 0.2% or less by weight of pods, stems, or coarse vegetable matter, including 0.1% or less of material other than whole or broken soybeans that passes through the No. 8 round-hole sieve.

In addition, in samples of commercially clean shipments, the amount of finely broken soybeans that passes through a No. 8 round-hole sieve

- On shipments not for direct export, can be up to 0.75% by weight
- On shipments for direct export, can be up to 1.0% by weight

Not commercially clean (NCC)

Shipments which, do not meet the definition of commercially clean, are considered not commercially clean and are allowed only with the permission of the CGC. 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

Soybeans on export are graded in accordance with primary grade standards and specifications.