



Official Grain Grading Guide

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14. Sunflower seed

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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 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.

Dockage not reported

- ▲ **Important:** Dockage is not reported for samples grading
 - *Sunflower Seed, Sample Canada Account Fireburnt*
 - *Sunflower Seed, Sample Salvage*
 - *Sunflower Seed, 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	#7 #9 for large-seeded varieties
Air control	#5 #7 for large-seeded varieties
Riddle	none
Top sieve	none
Centre sieve	blank tray
Bottom sieve	none
Sieve cleaner control	none

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 must be at least 750 grams.
3. Sieve portions of approximately 250 grams at a time.

4. Nest the No. 24 or No. 18 round-hole sieve over one of the following sieves, depending on the size of the seeds:
 - the No. 10 round-hole sieve
 - the No. 6 buckwheat sieve
5. Pass through the Carter dockage tester the material which has passed through the No. 24 or No. 18 round-hole sieve and remains on top of the No. 10 round-hole sieve (or the No. 6 buckwheat sieve).
6. Using a Boerner-type divider, divide a portion of approximately 250-g.
7. Handpick the 250-g portion for foreign material, including broken hulls, which are assessed as dockage up to the established grade tolerances.
8. From the 250-g portion, determine the percentage by weight of foreign material.

Note: The handpicked 250-g portion should be used to determine test weight.
9. Handpick from the material remaining on top of the No. 24 or No. 18 round-hole sieve all whole or broken sunflower seeds. Return them to the cleaned sample.
10. Determine dockage, using the list under *Composition of dockage*.

Composition of dockage

- Foreign material removed by either the No. 24 or No. 18 round-hole sieve
- Material removed by aspiration, except sound whole sunflower seeds
Note: Very immature seeds containing no meats are not considered sound.
- Material passing through either the No. 10 round-hole sieve or the No. 6 buckwheat sieve
- Coarse material handpicked from the sieved sample
- Soft earth pellets and other grains handpicked from the sieved sample up to 2.5%
- Sclerotinia handpicked from the sieved sample up to 2%
Note: In samples eligible for off-grades, other grains, sclerotinia and soft earth pellets are considered a grading factor and are not added to the dockage.

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 sunflower seed.
 - 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% Sunflower Seed, No. 1 CAN Confectionary
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, the net weight.

Kernel counts (K)

The kernel count is the number of kernel-sized pieces of foreign material in a 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 sample as “any pesticide, herbicide or desiccant.”

Representative portion sizes 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 of samples for grading.

Representative portion of sunflower seed for grading, grams

Grading factor	Minimum	Optimum	Export
Damage	100	100	100
Dehulled	500	working sample	working sample
Ergot	500	working sample	working sample
Excreta	working sample	working sample	working sample
Fireburnt	500	working sample	working sample
Heated, rotted, mouldy	100	100	100
Head rot (hulls)	25	100	100
Head rot (seeds)	5	25	25
Insect damage	100	100	100
Odour	working sample	working sample	working sample
Other grains	250	250	250
Sclerotinia sclerotiorum	250	working sample	working sample
Soft earth pellets	250	working sample	working sample
Stones	250	500	working sample
Very immature seeds	100	100	100

Grading factors

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 *Sunflower Seed, Sample Condemned*.

Damage (DMG)

Damaged seeds show at least one of following characteristics:

- Head rot damage
- Heated, rotted or mouldy
- Very immature
- Insect-damaged
- Otherwise materially damaged

Representative portion for analysis

Minimum—100 g

Optimum—100 g

Export—100 g

Dehulled (DHULL)

Hulled seeds are broken and whole seeds that are without hulls.

Representative portion for analysis

Minimum—500 g

Optimum—working sample

Export—working sample

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 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—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 *Sunflower Seed, 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 seeds are those that show any signs of being charred or scorched by fire.

Representative portion for analysis

Minimum—500 g

Optimum—working
sample

Export—working
sample

Foreign material (FM)

Foreign material in sunflower seed includes other grains, sclerotinia and stones.

Head rot damage

Head rot is damage most frequently caused by sclerotinia head rot disease.

Damage includes

- Hulls with 50% or more of the surface covered by white patches
- Seeds that are off colour, e.g., tan to dark brown
- Seeds that may contain small black sclerotia

Representative portion for analysis

Hulls

Minimum—25 g	Optimum—100 g	Exports—100 g
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Seeds

Minimum—5 g	Optimum—25 g	Exports—25 g
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Procedures

1. Using a Boerner-type divider, divide a representative portion for hulls.
2. Examine the portion and remove hulls with white patches covering 50% or more of the hull.
3. Divide the remaining representative portion for a subsample not less than 5 g.
4. Remove the hulls and examine the seeds for off-colour and the presence of sclerotia.

Heated, rotted or musty (HTD)

Heated seeds have the colour and or odour typical of seeds that have heated in storage or have been damaged by artificial drying.

Representative portion for analysis

Minimum—100 g	Optimum—100 g	Export—100 g
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Procedures

1. Pass the representative portion of the clean sample through a barley pearler for 3 to 5 seconds.
2. Separate heated, rotted or musty kernels from sound kernels.

If you are unsure whether the kernel is heated, rotted or musty, cut the seed lengthwise and examine the exposed meat. Brown-coloured meat is considered to be heated.

Insect damage (I DMG)

Insect-damaged seeds have hull perforations of any size caused by insects and include any hulled seeds which have been bored or chewed by insects.

Representative portion for analysis

Minimum—100 g	Optimum—100 g	Export—100 g
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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 . . .
An excessive objectionable odour not associated with the quality of the grain, but not heated or fireburnt	<i>Sunflower, Sample Canada Account Odour</i>
An excessive heated odour	<i>Sunflower, Sample Canada Account Heated</i>
An excessive fireburnt odour	<i>Sunflower, Sample Canada Account Fireburnt</i>

Other grains (OGS)

Other grains are any other grains that are not removed during cleaning.

In samples eligible for off-grades, other grains are considered a grading factor and are not added to the dockage.

Representative portion for analysis

Minimum—250 g

Optimum—250 g

Export—250 g

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.

In samples eligible for off-grades, sclerotia are considered a grading factor and are not added to the dockage.

Representative portion for analysis

Minimum—250 g

Optimum—working sample

Export—working
sample

Soft earth pellets (SEP)

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

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

Procedures

Earth pellets may be removed as dockage. See *Normal cleaning procedures*.

In samples eligible for off-grades, soft earth pellets are considered a grading factor and are not added to the dockage.

1. Return the pellets to the sample.
2. Handpick soft earth pellets from a representative portion of 100 g of the cleaned sample.
3. If soft earth pellets is the grade determinant, grade the sample *Sunflower Seed, Sample Canada Account Admixture*.

Representative portion for analysis

Minimum—250g	Optimum— working sample	Export—working sample
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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—250 g	Optimum—500 g	Export—working sample
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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 *Sunflower Seed, 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 *Sunflower Seed, Sample Canada Account Stones*.
 - In western and eastern Canada grain containing more than 2.5% stones is graded *Sunflower Seed, Sample Salvage*.

Examples: Western Canada

Excerpt from grade determinant tables for
Sunflower Seed, Canada, Oil

Grade name	Stones
No. 1 Canada	3K
No. 2 Canada	3K

K Number of kernel-sized pieces in 500 g

Basic grade:..... *Sunflower Seed, No. 1 Canada, Oil*

If the above sample contained	Grade in western Canada
6K stones	<i>Sunflower Seed, Rejected No. 1 Canada Oil Account Stones</i>
3.0% stones	<i>Sunflower Seed, Sample Salvage</i>

Examples: Eastern Canada

Excerpt from grade determinant tables for
Sunflower Seed, Canada, Oil

Grade name	Stones
No. 1 Canada	3K
No. 2 Canada	3K

K Number of kernel-sized pieces in 500 g

Basic grade:..... *Sunflower Seed, No. 1 Canada, Oil*

If the above sample contained	Grade in eastern Canada
6K stones	
3.0% stones	<i>Sunflower Seed, Sample Salvage</i>

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 *Sunflower Seed, 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

Sunflower seed is graded according to end use, either confectionary or oil.

On written request, the name of the variety as described by the owner or shipper may be shown as a notation in the remarks section of a certificate; for example, Said to be Commander variety.

Very immature seeds (VIM SDS)

Very immature seeds are whole sunflower seeds that contain no meat.

Representative portion for analysis

Minimum—100 g

Optimum—100 g

Export—100 g

Procedures

1. Using a Boerner-type divider, divide a representative portion.
2. Separate whole shrunken seed kernels from sound kernels.
3. Determine the percentage of seeds that do not contain meat by either pressing the seed on a hard surface with finger pressure or by manually opening the seed.
4. Very immature seeds are included in the percentage of damaged seeds for grade determination.

Primary and export grade determinants tables

Sunflower Seed, Canada Confectionery (CAN)

Grade name	Standard of quality		Damage				Dehulled seeds %	Foreign material			
	Minimum test weight (kg/hl)	Degree of soundness	Head rot %	Heated %	Insect damage %	Total %		Other grains %	Sclerotinia %	Soft earth pellets %	Stones
No. 1 Canada	31 (155)	Well matured and sweet	2	0.5	2	4	5	<u>2.5</u>	1	<u>2.5</u>	3K
No. 2 Canada	29 (144.4)	Reasonably well matured and sweet	5	1	4	8	5	<u>2.5</u>	2	<u>2.5</u>	3K
Grade, if No. 2 specs not met	<i>Sunflower Seed, Sample Canada Account Light Weight</i>		<i>Sunflower Seed, Sample Canada Account Damage</i>	<i>Sunflower Seed, Sample Canada Account Heated</i>	<i>Sunflower Seed, Sample Canada Account Insect Damage</i>	<i>Sunflower Seed, Sample Canada Account Damaged</i>	<i>Sunflower Seed, Sample Canada Account Dehulled</i>	<i>Sunflower Seed, Sample Canada Account Admixture</i>	<i>Sunflower Seed, Sample Canada Account Admixture</i>	<i>Sunflower Seed, Sample Canada Account Admixture</i>	2.5% or less— <i>Sunflower Seed, Rejected (grade) Account Stones, or Sunflower Seed, Sample Canada Account Stones</i> Over 2.5%— <i>Sunflower Seed, Sample Salvage</i>

K Number of kernel-sized pieces in 500 g

Sunflower Seed, Canada Oil (CAN)

Grade name	Standard of quality		Damage				Dehulled seeds %	Foreign material			
	Minimum test weight (kg/hl)	Degree of soundness	Head rot %	Heated %	Insect damage %	Total %		Other grains %	Sclerotinia %	Soft earth pellets %	Stones
No. 1 Canada	35.0 (169)	Well matured and sweet	2	0.5	2	5	5	<u>2.5</u>	1	<u>2.5</u>	3K
No. 2 Canada	31.0 (148.4)	Reasonably well matured and sweet	5	1	4	10	5	<u>2.5</u>	2	<u>2.5</u>	3K
Grade, if No. 2 specs not met	<i>Sunflower Seed, Sample Canada Account Light Weight</i>		<i>Sunflower Seed, Sample Canada Account Damage</i>	<i>Sunflower Seed, Sample Canada Account Heated</i>	<i>Sunflower Seed, Sample Canada Account Insect Damage</i>	<i>Sunflower Seed, Sample Canada Account Damaged</i>	<i>Sunflower Seed, Sample Canada Account Dehulled</i>	<i>Sunflower Seed, Sample Canada Account Admixture</i>	<i>Sunflower Seed, Sample Canada Account Admixture</i>	<i>Sunflower Seed, Sample Canada Account Admixture</i>	<i>2.5% or less—Sunflower Seed, Rejected (grade) Account Stones, or Sunflower Seed, Sample Canada Account Stones Over 2.5%—Sunflower Seed, Sample Salvage</i>

K Number of kernel-sized pieces in 500 g

Export shipments

Export shipments can be commercially clean or not commercially clean.

Commercially clean (CC)

Shipments with dockage levels up to 5.0% are considered commercially clean.

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

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

A direct deduction of up to 0.2% is applied to take into account the buildup of attritional material. Dockage is assessed using procedures for primary samples.

Grading

Sunflower seed on export is graded in accordance with primary grade standards and specifications