



Official Grain Grading Guide

August 1, 2007

Regional offices

Pacific Region	Phone: 604-666-0488	Fax: 604-666-8703
Prairie Region	Phone: 204-983-3308	Fax: 204-983-5382
Thunder Bay Region	Phone: 807-626-1400	Fax: 807-623-8701
Bayport Region	Phone: 519-436-3190	Fax: 519-436-3195
Eastern Region	Phone: 514-283-3873	Fax: 514-283-7699

Service centers

Brandon	Phone: 204-726-7665	Fax: 204-726-7676
Calgary	Phone: 403-292-4211	Fax: 403-292-5075
Melville	Phone: 306-728-6820	Fax: 306-728-6821
Moose Jaw	Phone: 306-692-2141	Fax: 306-694-1488
Saskatoon	Phone: 306-975-5714	Fax: 306-975-4258
Weyburn	Phone: 306-848-3350	Fax: 306-848-3353
Winnipeg	Phone: 204-983-2790	Fax: 204-984-5131

Quality ● Service ● Innovation

6. Barley

Classes, types and varieties	6-3
Classes	6-3
Malting	6-3
Hulless	6-3
General purpose	6-3
Types	6-3
Two-row barley	6-3
Six-row barley	6-3
Barley of other types	6-3
Determination of commercially clean	6-4
Determination of dockage	6-5
Definitions	6-5
Dockage not reported	6-5
Normal cleaning procedures	6-5
Composition of dockage	6-6
Cleaning for grade improvement	6-6
Optional analysis	6-7
Grading	6-8
Important definitions	6-8
Net weight of sample	6-8
Kernel counts (K)	6-8
Hazardous substances in samples	6-8
Representative portion for grading	6-9
Grading factors	6-10
Adhered hulls (ADHULLS)	6-10
Barley of other types (BOOT)	6-10
Broken (BKN)	6-10
Contaminated grain	6-10
Covered smut and false loose smut (SMUT)	6-10
Earth pellets (EP)	6-11
Ergot (ERG)	6-11
Excreta (EXCR)	6-11
Fertilizer pellets (FERT PLTS)	6-12
Fireburnt (FBNT)	6-12
Frost (FR)	6-12
Fusarium damage (FUS DMG)	6-13
Heated (HTD)	6-13
Inseparable seeds (INSEP SDS)	6-13
Mildew (MIL)	6-13
Odour (ODOR)	6-14
Other cereal grains (OCG)	6-14
Peeled and broken (PLD BKN)	6-14
Plump and thin kernels (PLMP, THIN)	6-15
Rotted kernels (ROT KRNL)	6-16
Sclerotinia sclerotiorum (SCL)	6-16
Severely mildewed (SEVMIL)	6-16
Smut	6-16
Soft earth pellets (SEP)	6-16

Sprouted (SPTD)	6-17
Stones (STNS)	6-17
Test weight (TWT)	6-18
Thin kernels (THIN)	6-19
Treated seed and other chemical substances	6-20
Varieties with adhered hulls	6-20
Weathered (WEATH)	6-21
Wild oats (WO)	6-21
Primary grade determinants tables.....	6-22
Barley, Canada Western/Canada Eastern Malting (CW/CE)	6-22
Barley, Canada Western/Canada Eastern Hulless (CW/CE).....	6-24
Barley, Canada Western/Canada Eastern General Purpose (CW/CE)	6-26
Export shipments.....	6-27
Commercially clean	6-27
Not commercially clean (NCC)	6-27
Grading.....	6-27
Export grade determinants tables.....	6-28

Classes, types and varieties

Classes

Barley is divided into three classes based on end use, malting, hulless and general purpose.

Malting

Malting barley is a dual purpose barley. If production cannot be sold at a premium for malting and brewing, then it is used for livestock feed. Only about 20 percent of malting barley production is actually *selected* for malting each year. The other 80 percent is used domestically as livestock feed or exported as feed barley. Registered feed barley is not suitable for malting and brewing, and can be used only for livestock feed.

There are three malting grades, *Special Select*, *Select*, and *Standard*. Barley selected for malting that does not qualify for one of these grades is graded *Barley, Sample Select CW/CE, Two-row/Six-row Account "Factor"*.

Hulless

Hulless barley is used primarily for animal feed, mostly for swine, but it is also marketed for human consumption. Hulless varieties have a very loose hull which is usually removed during harvesting.

There are two hulless grades, *Select* and *Standard*. Hulless barley not selected may be assigned only to the *Standard* grade.

General purpose

General purpose grades include barley not selected for malting.

Types

Two-row barley

A head of two-row barley contains two rows of kernels along its length.

Six-row barley

A head of six-row barley contain six rows of kernels along its length, in two groups of three kernels each.

Barley of other types

In two-row barley, barley of other types is any six-row variety. In six-row barley, barley of other types is any two-row variety.

Determination of commercially clean

All samples must be analyzed to determine if they are commercially clean prior to dockage assessment. The analysis of samples, that 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 passing the sample over the Carter dockage tester as set up below and weighing the small seeds, then primary dockage assessment procedures can be followed. Where there is any doubt regarding whether the sample is commercially clean, the sample must be analysed using the procedures outlined in steps 1 through 4 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 must be at least 750 grams.
2. Pass the sample over the Carter dockage tester set up as follows:

Feed control	5
Air control	3
Riddle	None
Top sieve	No. 4.5 round-hole
Centre sieve	Blank tray
Bottom sieve	None
Sieve cleaner control	Off

3. 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 Barley Export grade determinant table)
4. All material passing through the No. 4.5 round-hole sieve is combined with dust and chaff removed by aspiration and the percentage calculated to determine if they meet the commercially clean specification of the grade for Total small seeds, attrition, dust and chaff. (Column #2 in the Barley Export grade determinant table)

Should the percentage concentration of either of the factors determined in steps 1 through 4 exceed the specifications set out in columns 1 or 2 of the barley export grade determinant table, the sample will be considered to be not commercially clean. Dockage will be assessed on samples determined to be not commercially clean by following the procedures defined under *Determination of dockage*.

Determination of dockage

Definitions

Dockage is assessed 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 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
 - *Barley, Sample CW/CE, Account Fireburnt*
 - *Barley, Sample Salvage*
 - *Barley, 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	No. 6
Riddle	No. 6
Top sieve	No. 6 buckwheat
Centre sieve	No. 5 buckwheat
Bottom sieve	Blank tray
Sieve cleaner	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 must 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 2 to 3 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.

▲ **Important:** These are the normal settings. Ensure when you aspirate general purpose barley that you do not remove light weight barley from the sample.

If the aspirated material contains lightweight barley,

1. Return the material to the sample.
 2. Reset the Carter dockage tester with a lower air setting to remove only lightweight dockage material.
 3. Pass it through the Carter dockage tester again.
8. Remove the aspiration pan.
 9. Determine dockage, using the list under *Composition of dockage*.

Composition of dockage

Dockage includes

- Material removed over the No. 6 riddle
- Lightweight material removed by aspiration
- Material that is removed by the No. 5 buckwheat Carter sieve
- A maximum of 10% of 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.

1. After normal cleaning, examine the material to be removed and select your equipment according to the material you want to remove. See the table *Cleaning for grade improvement—Barley* for the list of equipment.
2. Sieve the sample by hand, or pass it through the Carter dockage tester, depending on the material.

▲ **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.
3. Weigh the additional dockage and add it to the original dockage.

Cleaning for grade improvement—Barley

Material to be removed	Equipment	Effect on composition of dockage
Large seeds	No. 6 buckwheat hand sieve	<p>Large seeds are</p> <ul style="list-style-type: none"> • Seeds that do not pass through the No. 4.5 round-hole sieve • Grains other than cereal grains, such as peas, beans, corn flaxseed and domestic buckwheat • Ragweed and Tartary buckwheat <p>Assess material as dockage, provided the grade is improved and not more than 5.0% of barley is removed.</p>
Covered smut and false loose smut	Carter dockage tester, set up for <i>Normal cleaning procedures</i> , with air control set to 7	<p>If the percentage by weight of material removed is</p> <ul style="list-style-type: none"> • Less than 2.0% of the gross weight of the sample, add to dockage • 2.0% or more of the gross weight of the sample, the sample is sent to the Chief Grain Inspector for review
Wild oats, shrunken barley and rye grass	No. 9x9 wire hand sieve	For malting and the select hullless grades, wild oats, shrunken barley and rye grass that exceed the grade tolerance are included in dockage.
Attached awns	Hand rub Carter dockage tester for aspiration	Removes awns Separates detached awns from working sample. Awns removed to be included in 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 barley.
 - 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% Barley, No. 1 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, the net weight.

Kernel counts (K)

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

- To do kernel counts, you must have 500 g 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 the 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 portions of samples for grading.

Representative portion of barley for grading, grams

Grading factor	Minimum	Optimum	Export
Adhered hulls	100	250	250
Barley of other types	10	10	10
Broken	25	50	50
Covered smut and false loose smut	working sample	working sample	working sample
Ergot	500	1000	1000
Excreta	working sample	working sample	working sample
Fireburnt	500	working sample	working sample
Frost	25	100	100
Fusarium damage	25	100	100
Heated	25	100	100
Inseparable seeds — malting and hullless	100	working sample	working sample
Inseparable seeds — general purpose	100	100	100
Odour	working sample	working sample	working sample
Other cereal grains	50	100	250
Peeled and broken	50	100	100
Plump and thin	250	250	250
Rotted kernels	50	250	100
Sclerotinia sclerotiorum	500	1000	1000
Severe mildew	50	100	100
Soft earth pellets	working sample	working sample	working sample
Sprouted	25	25	25
Stones	500	1000	1000
Varieties with adhered hulls	50	100	250
Weathered	working sample	working sample	working sample
Wild oats	50	100	250

Grading factors

Adhered hulls (ADHULLS)

Adhered hulls are kernels of hullless varieties with hulls that have not been removed during harvesting. See *Varieties with adhered hulls*.

Representative portion for analysis

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

Barley of other types (BOOT)

In two-row barley, barley of other types is any six-row variety. In six-row barley, barley of other types is any two-row variety.

Representative portion for analysis

Minimum—10 g Optimum—10 g Export—10 g

Broken (BKN)

Broken kernels are pieces that are less than three-quarters of a whole kernel and kernels with the germ end broken off.

Representative portion for analysis

Minimum—25 g Optimum—50 g Export—50 g

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 *Barley, Sample Condemned*.

Covered smut and false loose smut (SMUT)

There are no specific numeric tolerances for smut. In evaluating smut as a grading factor, consider

- The degree of smut tag on the kernels
- The number of pieces of covered smut left in the cleaned sample

Representative portion for analysis

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

If the sample . . .	Then the grade is . .		
	Malting	Hulless	General purpose
Contains about 5K of covered smut and no tagged kernels	<i>Barley, Select CW/CE Two-row/Six-row</i>	<i>Barley, Standard CW/CE Hulless</i>	<i>Barley, No. 1 CW/CE</i>
Contains many pieces of covered smut and smut-tagged kernels	<i>Barley, Standard Select CW/CE Two-row/Six- row</i>	<i>Barley, Sample CW/CE Hulless, Account Smut</i>	<i>Barley, No. 2 CW/CE</i>
Is severely contaminated	<i>Barley, Sample CW/CE Two-row/Six-row, Account Smut</i>	<i>Barley, Sample CW/CE Hulless, Account Smut</i>	<i>Barley, Sample CW/CE, Account Smut</i>

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 fungus bodies with 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

For *CE* and *CW* hulless grades

- If the number of ergot pieces is not excessive, determine the kernel count.
- If the number of ergot pieces is excessive, determine the weight of ergot as a percentage of the net weight of the sample.

For all other *CW* grades

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 *Barley, 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 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.

Representative portion for analysis

Minimum—500 g

Optimum—working
sample

Export—working
sample

Frost (FR)

For varieties with hulls—frost-damaged kernels have distinctly indented backs, and usually a loose hull. Kernels with a light wrinkling from frost are not considered frost-damaged.

For hullless varieties—frost-damaged kernels have severe wrinkling and translucent endosperms.

- ▲ **Important:** Determine frost-damaged kernels and *Peeled and broken* prior to sizing the sample. Sizing tends to peel kernels.

Representative portion for analysis

Minimum—25 g

Optimum—100 g

Export—100 g

Procedures—Malting and hullless grades

1. Use a representative portion of at least 25 grams of the cleaned sample.
2. Determine the percentage of frost-damaged kernels.

Fusarium damage (FUS DMG)

Fusarium-damaged kernels of barley are discoloured by pink, orange or black encrustations of fusarium mould. Under magnification, the black encrustations appear raised above the surface of the kernel and are surrounded by a white mould. The black encrustations can be scraped off.

Some degree of judgment is required when identifying kernels with the fusarium mould. Only those kernels which meet this description are to be designated as fusarium damaged.

Representative portion for analysis

Minimum—25 g Optimum—100 g Export—100 g

Procedures

Confirm the presence of fusarium mould using a 10-power magnifying lens.

Heated (HTD)

Heated kernels have the colour or odour typical of grain that has deteriorated in storage or has been damaged by artificial drying. The hull over the germ of the heated kernels often appears discoloured, usually to a golden brown.

Representative pearled portion for analysis

Minimum—25 g Optimum—100 g Export—100 g

Procedures

A representative portion of the cleaned sample is passed through a barley pearler for up to 10 seconds. When the hull is removed by pearling the germ appears red or brown. As the degree of heat damage increases, a greater portion of the pearled kernel exhibits the red discolouration.

Inseparable seeds (INSEP SDS)

Inseparable seeds are those not removed by the cleaning process, usually large seeds. See *Glossary*.

Representative portion for analysis—malting and hulless grades

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

Representative portion for analysis—general purpose grades

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

Procedures

- Assess as dockage if they are removed by *Cleaning for grade improvement*.
 - Malting and hulless grades may not contain any large oil-bearing seeds such as sunflower seeds, safflower seeds or soybeans.
-

Mildew (MIL)

Mildew is a fungal condition that develops in unthreshed grain usually under conditions of excessive moisture. The affected kernels are grayish in colour and lower in quality. In the evaluation of mildew, consider the number of affected kernels and their severity. See *Severe mildew*.

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	<i>Barley, Standard Select CW/CE Two-row/Six-row</i> <i>Barley, Sample CW/CE Hulless Account Odour</i> <i>Barley, Sample CW/CE Account Odour</i>
A distinct, heated odour	<i>Barley, Standard Select CW/CE Two-row/Six-row</i> <i>Barley, Sample CW/CE Hulless Account Heated</i> <i>Barley, Sample CW/CE Account Heated</i>
A distinct, fireburnt odour	<i>Barley, Standard Select CW/CE Two-row/Six-row</i> <i>Barley, Sample CW/CE Hulless Account Fireburnt</i> <i>Barley, Sample CW/CE Account Fireburnt</i>

Other cereal grains (OCG)

Other cereal grains include wheat, rye, oats or triticale remaining in the cleaned sample.

Representative portion for analysis

Minimum—50 g

Optimum—100 g

Export—250 g

Peeled and broken (PLD BKN)

Peeled kernels are kernels with at least one of the following characteristics:

- One-third or more of the hull is removed, including kernels of hulless barley
- The germ is fully exposed
- The hull is badly frayed or ruptured over the germ end without evidence of germination
- The hull is removed along both edges.

Broken kernels are pieces of kernels that are less than three-quarters of a whole kernel and kernels with the germ end broken off.

▲ **Important:** Determine peeled and broken and frost-damaged kernels prior to sizing the sample. Sizing tends to peel kernels.

Representative portion for analysis

Minimum—50 g

Optimum—100 g

Export—100 g

Plump and thin kernels (PLMP, THIN)

The process for determining plump and thin kernels is called sizing.

- Plump kernels are kernels that remain on top of or lodged in the No. 6 slotted sieve. These are a grading factor for malting barley only.
- Thin kernels are kernels that pass through the No. 5 slotted sieve. These are a grading factor for malting and hulless barley.

▲ **Important:** Determine frost-damaged kernels and peeled and broken prior to sizing the sample. Sizing tends to peel kernels.

Procedures

1. Using a Boerner-type divider, divide a representative portion of not less than 250 grams from the cleaned sample.
2. Set the Carter dockage tester as follows:

Feed control	# 5
Air control	Off
Riddle	None
Top sieve	No. 6 slotted
Centre sieve	No. 5 slotted
Bottom sieve	Blank tray
Sieve cleaner control	Off

3. Pass the representative portion through the Carter dockage tester once.
4. When most of the sample has passed over the sieves, turn on the sieve cleaner control for five kicks of the machine to loosen lodged kernels.

▲ **Important:** Do not rap sieves in the machine to loosen lodged kernels.

5. Remove each sieve carefully from the machine.
6. Remove lodged kernels from each sieve. Add them to the barley that passed over that sieve.
7. Weigh separately
 - Plump kernels on top of or lodged in No. 6 slotted sieve
 - Thin kernels that passed through the No. 5 slotted sieve

Representative portion for analysis

Minimum—250 g

Optimum—250 g

Export—250 g

Rotted kernels (ROT KRNL)

Rotted kernels are discoloured, swollen, soft and spongy as a result of decomposition by fungi or bacteria. Consider rotted kernels in combination with severely mildewed and heated.

Representative portion for analysis

Minimum—50 g

Optimum—250 g

Export—100 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 coarse surface texture, vary in exterior color from dark black to gray to white and have a pure white interior.

Representative portion for analysis

Minimum—500 g

Optimum—1000 g

Export—1000 g

Severely mildewed (SEVMIL)

Severe mildew refers to kernels that are severely blackened by mildew. See *Mildew*. Consider severe mildew in combination with rotted and heated kernels.

Representative portion for analysis

Minimum—50 g

Optimum—100 g

Export—100 g

Smut

See Covered smut and false loose smut.

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 analysisMinimum—working
sampleOptimum—working
sampleExport—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 *Barley, Sample CW/CE Account Admixture*.

Sprouted (SPTD)

Sprouted kernels show definite signs of germination.

Procedures for malting grades

1. Select a representative portion of not less than 25 grams.
2. Pass the sample through the pearler for two or three seconds.
3. Analyse the lightly pearled sample for evidence of germination.

General purpose grades

Analyse without pearling.

Representative portion for analysis

Minimum—25 g

Optimum—25 g

Export—25 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 *Barley, 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 *Barley, Sample Canada Eastern Account Stones*.
 - In western and eastern Canada grain containing more than 2.5% stones is graded *Barley, Sample Salvage*.

Examples: Western Canada

Excerpt from grade determinant tables for
Barley, CW General Purpose

Grade name	Stones %
No. 2 CW	0.15

Basic grade:..... *Barley, No. 2 CW*

Reason for basic grade:..... Stained

If the above sample contained	Grade in western Canada
0.5% stones	<i>Barley, Rejected No. 2 CW Account Stones</i>
3.0% stones	<i>Barley, Sample Salvage</i>

Examples: Eastern Canada

Excerpt from grade determinant tables for
Barley, CE General Purpose

Grade name	Stones %
No. 2 CE	0.15

Basic grade:..... *Barley, No. 2 CE*

Reason for basic grade:..... Stained

If the above sample contained	Grade in eastern Canada
0.5% stones	<i>Barley, Sample CE Account Stones</i>
3.0% stones	<i>Barley, Sample Salvage</i>

Test weight (TWT)

Test weight is the weight of a measured volume of grain expressed in kilograms per hectolitre. If a barley sample contains kernels with attached awns that reduce the test weight and affect the grade, see procedures for *Cleaning for grade improvement*.

Thin kernels (THIN)

The process of determining the percentage by weight of thin kernels is called sizing. For sizing of malting barley, see *Plump and thin kernels*.

Thin kernels are kernels that pass through the No. 5 slotted sieve. These are a grading factor for malting and hulless barley.

- ▲ **Important:** Determine frost-damaged kernels and peeled and broken first. Then size the sample. Sizing tends to peel kernels.

For hulless grades only—the general appearance of the sample and factors other than size are taken into account in grading. Samples scant in sizing requirements but otherwise sound are given the benefit of the doubt in grading.

Representative portion for analysis

Minimum—250 g

Optimum—250 g

Export—250 g

Procedures

1. Obtain a representative portion of not less than 250 grams of the cleaned sample.
2. Set up the Carter dockage tester as follows:

Feed control	# 5
Air control	Off
Riddle	None
Top sieve	None
Centre sieve	No. 5 slotted
Bottom sieve	Blank tray
Sieve cleaner control	Off

3. Run the representative portion through the Carter dockage tester once.
4. When the bulk of the sample has passed over the sieves, turn on the sieve cleaner control for only five kicks of the machine to loosen lodged kernels.

- ▲ **Important:** Do not rap sieves in the machine to loosen lodged kernels.

5. Weigh thin kernels that pass through the No. 5 slotted sieve

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 *Barley, 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 with adhered hulls

For select hullless barley—varieties with adhered hulls are considered as *Other cereal grains*.

For standard hullless barley—varieties with adhered hulls are any kernels of non-hullless varieties.

Representative portion for analysis

Minimum—50 g

Optimum—100 g

Export—250 g

Weathered (WEATH)

Weathered kernels are discoloured by weathering to a very deep yellow or light brown. Severely weathered kernels are severely discoloured. They may be dark brown, heavily stained or distinctly bleached and may also be mildewed. Consider the number of affected kernels and their condition when you assess the general colour of the sample.

Representative portion for analysis

Minimum—working
sample

Optimum—working
sample

Export—working
sample

Wild oats (WO)

Wild oats is an annual grassy weed. The seeds vary in colour from white to black. They are normally more slender than domestic oats, and have a slanting, circular depressed scar, sometimes called a sucker mouth, at the base, and a bent twisted awn.

Representative portion for analysis

Minimum—50 g

Optimum—100 g

Export—250 g

Primary grade determinants tables

Barley, Canada Western/Canada Eastern Malting (CW/CE)

Grade name	Standard of quality				Standard of quality					
	Minimum test weight kg/hl (g/0.5 L)	Variety	Degree of soundness	Barley of other types %	Fireburnt %	Frost %	Fusarium %	Heated, rotted, severely mildewed %	Peeled and broken %	Sprouted %
Special Select CW/CE Two-row	63 (303)	Any selected variety of the class Barley, Canada Western/Eastern Malting Two-row designated as such by Order of the Commission	Reasonably sound, fairly well matured, may be moderately weather-stained, but not severely discoloured	1	Nil	0.2	Nil	Nil	4	Nil
Special Select CW/CE Six-row	62 (298)	Any selected variety of the class Barley, Canada Western/Eastern Malting Six-row designated as such by Order of the Commission	Reasonably sound, fairly well matured, may be moderately weather-stained, but not severely discoloured	1	Nil	0.2	Nil	Nil	4	Nil
Select CW/CE Two-row	61 (293)	Any selected variety of the class Barley, Canada Western/Eastern Malting Two-row designated as such by Order of the Commission	Fairly sound, may be slightly immature and moderately weather-stained or discoloured	3	Nil	1	0.2	Nil	6	0.5
Select CW/CE Six-row	60 (288)	Any selected variety of the class Barley, Canada Western/Eastern Malting Six-row designated as such by Order of the Commission	Fairly sound, may be slightly immature and moderately weather-stained or discoloured	3	Nil	1	0.2	Nil	6	0.5
Standard Select CW/CE Two-row/Six-row	No minimum	Any selected variety of the class Barley, Canada Western/Eastern Malting Two-row or Six-row designated as such by Order of the Commission	Excluded from other grades of malting quality barley on account of weather-staining or discolouration and objectionable odour	No limit	No limit	No limit	0.2	No limit	No limit	No limit
Grade if specs for Standard Select CW/CE Two-row/Six-row not met		Non designated varieties which are selected for malting purposes are only eligible for the grade <i>Barley, Sample CW/CE Two-row/Six-row Account Variety</i>					<i>Barley, Sample CW/CE Two-row/Six-row Account Fusarium Damage</i>			

Note: Barley not selected for malting will be graded according to quality into the "General Purpose" grades.

Barley, Canada Western/Canada Eastern Malting (CW/CE), continued

Grade name	Sizing		Foreign material								
	Plump %	Thin %	Ergot %		Excreta %	Inseparable seeds %	Other cereal grains %	Sclerotinia %	Stones %	Wild oats %	Total %
			CW	CE							
Special Select CW/CE Two-row	85	3	Nil	Nil	0.010	0.2 Free of large oil-bearing seeds	1	0.01	0.02	0.2	1.0
Special Select CW/CE Six-row	75	4	Nil	Nil	0.010	0.2 Free of large oil-bearing seeds	1	0.01	0.02	0.2	1.0
Select CW/CE Two-row	80	3	<u>0.025</u>	1K	0.010	0.2 Free of large oil-bearing seeds	1	0.01	0.02	0.5	<u>1.5</u>
Select CW/CE Six-row	70	4	<u>0.025</u>	1K	0.010	0.2 Free of large oil-bearing seeds	1	0.01	0.02	0.5	<u>1.5</u>
Standard Select CW/CE Two-row/Six-row	No minimum	No limit	No limit		0.010	0.2 Free of large oil-bearing seeds	No limit	No limit	No limit	No limit	No limit
Grade if specs for Standard Select CW/CE Two-row/Six-row not met					<i>Barley Sample Select CW/CE Two-row/Six-row Account Excreta</i>	<i>Barley Sample Select CW/CE Two-row/Six-row Account Admixture</i>					

K Number of kernel-sized pieces in 500 g

Note: Barley not selected for malting will be graded according to quality into the "General Purpose" grades.

Barley, Canada Western/Canada Eastern Hulless (CW/CE)

Grade name	Standard of quality					Damage				
	Minimum test weight kg/hl (g/0.5 l)	Varieties with adhered hulls %	Other hulless varieties %	Total adhered hulls %	Degree of soundness	Broken %	Fireburnt %	Frost %	Heated, rotted, severely mildewed %	Sprouted %
Select CW/CE Two-row Hulless	75 (360)	Considered as other cereal grains	5	5	Fairly sound, may be slightly immature and moderately weather-stained or discoloured	4	Nil	2	0.2	0.5
Select CW/CE Six-row Hulless	74 (355)	Considered as other cereal grains	5	5	Fairly sound, may be slightly immature and moderately weather-stained or discoloured	4	Nil	2	0.2	0.5
Standard CW/CE Hulless	72 (346)	15	No limit	15	Reasonably sweet, may be frost-damaged, weather-stained or otherwise damaged	15	Nil	No limit	0.5	10
Grade, if Standard specs not met	<i>Barley, Sample CW/CE Hulless Account Light Weight</i>	50% or less– <i>Barley, Sample CW/CE Hulless Account Adhered Hulls</i>		<i>Barley, Sample CW/CE Hulless Account Adhered Hulls</i>		<i>Barley, Sample Broken Grain</i>	<i>Barley, Sample CW/CE Hulless Account Fireburnt</i>		<i>Barley, Sample CW/CE Hulless Account Heated</i>	<i>Barley, Sample CW/CE Hulless Account Sprouted</i>

K Number of kernel-sized pieces in 500 g

Barley, Canada Western/Canada Eastern Hulless (CW/CE), continued

Grade name	Sizing	Foreign material							
	Thin %	Ergot %	Excreta %	Inseparable seeds %	Other cereal grains %	Sclerotinia %	Stones %	Wild oats %	Total %
Select CW/CE Two-row Hulless	5	3K	0.010	0.2 Free of large oil-bearing seeds	1	0.01	2K	0.5	1
Select CW/CE Six-row Hulless	5	3K	0.010	0.2 Free of large oil-bearing seeds	1	0.01	2K	0.5	1
Standard CW/CE Hulless	No limit	0.05	0.020	0.2	3	0.01	5K	1	3
Grade, if Standard specs not met		<i>Barley, Sample CW/CE Hulless Account Ergot</i>	<i>Barley, Sample CW/CE Hulless Account Excreta</i>	<i>Barley, Sample CW/CE Hulless Account Admixture</i>	<i>50% or less– Mixed Grain, CW/CE Barley</i>	<i>Barley, Sample CW/CE Hulless Account Admixture</i>	<i>2.5% or less– Barley, Rejected (CW grade) Account Stones or Barley, Sample CE Hulless Account Stones</i> <i>Over 2.5%– Barley, Sample Salvage</i>	<i>50% or less– Mixed Grain, CW/CE Barley</i>	<i>50% or less– Mixed Grain, CW/CE Barley</i>

K Number of kernel-sized pieces in 500 g

Barley, Canada Western/Canada Eastern General Purpose (CW/CE)

Grade name	Standard of quality			Damage				
	Minimum test weight kg/hl (g/0.5 l)		Degree of soundness	Broken %	Fireburnt %	Fusarium %	Heated, rotted, severely mildewed %	Sprouted %
	CW	CE						
No. 1 CW/CE	63 (303)	60 (288)	Reasonably sweet, may be frost-damaged, weather-stained or otherwise damaged	15	Nil	1.0	0.5	10
No. 2 CW/CE	57 (274)	54 (260)	Fairly sweet, excluded from other grades of barley on account of immature or severely damaged kernels	25	0.5	1.0	<u>2.5</u>	20
Grade, if No. 2 specs not met	<i>Barley, Sample CW Account Light Weight</i>	<i>Barley, Sample CE Account Light Weight</i>		<i>Barley, Sample CW/CE Broken Grain</i>	<i>Barley, Sample CW/CE Account Fireburnt</i>	<i>Barley, Sample CW/CE Account Fusarium Mould</i>	<i>Barley, Sample CW/CE Account Heated</i>	<i>Barley, Sample CW/CE Account Sprouted</i>

Grade name	Foreign material							
	Ergot %	Excreta %	Inseparable seeds %	Other cereal grains %	Sclerotinia %	Stones %	Wild oats %	Total %
No. 1 CW/CE	0.05	0.020	0.2	<u>2.5</u>	0.01	<u>0.15</u>	1	<u>2.5</u>
No. 2 CW/CE	0.1	0.020	0.2	8	0.01	<u>0.15</u>	<u>2.5</u>	10
Grade, if No. 2 specs not met	<i>Barley, Sample CW/CE Account Ergot</i>	<i>Barley, Sample CW/CE Account Excreta</i>	<i>Barley, Sample CW/CE Account Admixture</i>	<i>50% or less- Mixed Grain CW/CE Barley</i>	<i>Barley, Sample CW/CE Account Admixture</i>	<i>2.5% or less- Barley, Rejected (CW grade) Account Stones or Barley Sample CE Account Stones Over 2.5%- Barley, Sample Salvage</i>	<i>50% or less- Mixed Grain CW/CE Barley</i>	<i>50% or less- Mixed Grain CW/CE Barley</i>

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 barley.

Not commercially clean (NCC)

Shipments that do not meet the standards for commercial cleanliness are referred to as *not commercially clean*. Such shipments are possible 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

Western malting barley on export is graded in accordance with primary standards and specifications.

Export grade determinants tables

Grade name	Commercial cleanliness	
	(1) Small seeds %	(2) Total, small seeds, attrition, dust and chaff %
Special select CW two-row	0.1	0.2
Special select CW six-row	0.1	0.2
Select CW two-row	0.1	0.2
Select CW six-row	0.1	0.2

Grade name	Foreign material									
	Commercial cleanliness		Ergot %	Large seeds %	Other cereal grains %	Mineral matter		Sclerotinia %	Wild oats %	Total %
	(1) Small seeds %	(2) Total, small seeds, attrition, dust and chaff %				Stones %	Total %			
No. 1 CW	0.1	0.2	0.05	0.2	<u>2.5</u>	<u>0.15</u>	<u>0.25</u>	0.01	1	<u>2.5</u>
No. 2 CW	0.1	0.2	0.1	0.2	8	<u>0.15</u>	<u>0.25</u>	0.01	<u>2.5</u>	10

Grade name	Sizing		Damage	
	Plump %	Thin %	Heated %	Peeled and broken %
No. 1 CW	No limit	No limit	0.5	15 Broken
No. 2 CW	No limit	No limit	<u>2.5</u>	25 Broken