

## 6. Barley

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## Classes, types and varieties

### Classes

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

#### Malting

Only the varieties on the malting barley variety designation list are eligible for the malting grades. 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, exported as feed barley or may be selected for food grade.

There is one malting grade *Select*. Malting barley may be covered or hulless varieties. Barley selected for malting that does not qualify for this grade is graded *Barley, Sample Select CW/CE, Two-row/Six-row Account "Factor"*.

#### Food

Food barley can be any variety of barley (hulless or covered) that has been selected for a food market. There is a growing interest from food processors for barley in food products. Some examples of food uses are ready-to-eat breakfast cereals, rice like products (after splitting and polishing), thickeners, health foods, tea, etc.

#### General purpose

General purpose grades include covered and hulless barley not selected for malting or food. General purpose barley is used primarily for animal feed.

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### Types

#### Covered

The term covered refers to varieties of barley with the outer hull still attached after harvesting. Covered barley varieties may be two-row or six-row.

#### Hulless

The term hulless refers to varieties of barley in which the outer hull is loosely adhered to the kernel. The outer hull is so loose, that when this barley is harvested in the field, the outer hull is usually removed. Processors often refer to this type of barley as “naked” barley. Hulless barley varieties may be two-row or six-row.

#### 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.

## 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 7 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 shall be at least 1 kg.
  - Unofficial samples shall be at least 1 kg.
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. The sample portion passing over the 4.5 round-hole sieve is divided using a Boerner-type divider to a representative portion of not less than 250 grams
5. The portion divided from step 4 is handpicked to remove roughage (as defined in the *Glossary*)
6. Roughage is weighed and the percentage is calculated
7. All material passing through the No. 4.5 round-hole sieve is combined with dust and chaff removed by aspiration and handpicked roughage material are added together to determine if they meet the commercially clean specification of the grade for Total small seeds, attrition, dust, chaff and roughage. (Column #2 in the Barley Export grade determinant table)

Should the percentage concentration of either of the factors determined in steps 1 through 7 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 the cleaning assessment 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 shall be at least 1 kg.
  - Unofficial samples shall be at least 1 kg.

3. Turn on the Carter dockage tester.
4. Pour the sample into the hopper.
5. After the sample has passed through the machine, turn on the sieve cleaner control for 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 other than barley 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 the cleaning assessment has been completed.

1. After the cleaning assessment has been completed, 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

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

**Optional analysis**

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

**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.

#### 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, desiccant or inoculant.”

#### Food Barley

The selection of barley for food purposes is the responsibility of selecting companies. Each individual company has their own selection criteria and specifications. All barley selected for food purposes will be graded according to the specification list in the Barley CW / CE Food primary grade determinant tables.

#### Malting Barley

The selection of barley for malting purposes is the responsibility of selecting companies. Each individual company has their own selection criteria and specifications. All barley selected for malting purposes will be graded according to the specification list in the Barley CW / CE malting primary grade determinant tables.

#### Producer Deliveries

Once barley has been selected for malting purposes, if there is a disagreement on the assessment of any factors listed in the “Characteristics of Malt Barley” table, the CGC, upon request will perform an analysis of the disputed factor. A representative portion of not less than 1000 grams of the unload will be forwarded to the CGC along with a request in writing (form I-106 in western Canada or I-107 for eastern Canada) specifying which factors are to be analyzed.

Characteristics of Malt Barley	
Peeled and Broken	Other cereal grains
Sprouted	Wild oats
Barley of other types	Total Foreign Material
Plump and Thin	Protein

Note: Specific tolerances are set by the selecting company.

## Non-Registered Varieties

Where grain of any kind is not a registered variety under the Seeds Act, no person shall, except with the permission of the Canadian Grain Commission, assign a statutory grade to that grain which is higher than the lowest grade established by regulation for that kind of grain.

## Representative portion for grading

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

The terms “Minimum” and “Maximum” refer to the range of sample portion size to be analyzed when an objective factor is present. The *optimum representative portion* (see glossary) is determined by taking into consideration the tolerance and concentration of the objective factor being assessed.

### Representative portion of barley for grading, grams

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

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### 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.

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### Broken (BKN)

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

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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 *Barley, Sample Condemned*.

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**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

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

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**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*.
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**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.

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**Excreta (EXCR)**

Excrement from any animal including mammals, birds and insects.

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

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**Fertilizer pellets (FERT PLTS)**

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

**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.

**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*.

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**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.

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**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.

**Procedures—Malting and food grades**

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

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**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.

**Procedures**

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

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**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.

**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.
- Heated seeds of other grains are included in the tolerance for *Heated*.

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**Inseparable seeds (INSEP SDS)**

Inseparable seeds are those not removed by the cleaning process, usually large seeds including grains other than cereal grains, such as peas, beans, corn, flaxseed and domestic buckwheat. See *Glossary*.

**Procedures**

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

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**Large oil-bearing seeds**

Large oil-bearing seeds are special crop seeds that may be crushed for oil. They may include sunflower, safflower or soybeans.

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**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*.

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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

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, Sample Select Malting CW/CE Two-row/Six-row Account Odour</i> <i>Barley, Sample Select Food CW/CE Account Odour</i> <i>Barley, Sample CW/CE Account Odour</i>
A distinct, heated odour	<i>Barley, Sample Select Malting CW/CE Two-row/Six-row Account Heated</i> <i>Barley, Sample Select Food CW/CE Account Heated</i> <i>Barley, Sample CW/CE Account Heated</i>
A distinct, fireburnt odour	<i>Barley, Sample Select Malting CW/CE Two-row/Six-row Account Fireburnt</i> <i>Barley, Sample Select Food CW/CE Account Fireburnt</i> <i>Barley, Sample CW/CE Account Fireburnt</i>
	<b>Note:</b> If hulless grade add "Hulless" to the grade name

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**Other cereal grains (OCG)**

Other cereal grains include wheat, rye, oats or triticale remaining in the cleaned sample. For grading purposes, spelt and Kamut® are considered as *Other cereal grains* in samples of barley.

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**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.

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### 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.
- Thin kernels are kernels that pass through the No. 5 slotted sieve.
- These are a characteristic of malting 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

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### 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.



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**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.

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**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.

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**Smut**

See Covered smut and false loose smut.

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**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

**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*.
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**Sprouted (SPTD)**

Sprouted kernels show definite signs of germination.

**Procedures for malting grades (covered barley only)**

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.

**Food, general purpose and hulless grades**

Analyse without pearling.

**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.)

**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>

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**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>

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**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*.

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## 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 characteristic of malting 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.

### 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

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## 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.

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.

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## Varieties with adhered hulls

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

For general purpose hulless barley—varieties with adhered hulls are any kernels of non-hulless varieties.

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## 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.

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## 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.

## Primary grade determinants tables

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

		Variety	Standard of Quality											
			Damage					Foreign Material						
Grade name			Adhered Hulls %	Fireburnt %	Frost %	Fusarium %	Heated %	Rotted, Severely Mildewed %	Ergot %	Excreta %	Sclerotinia %	Stones %	Inseparable seeds %	Large oil-bearing seeds
Covered	Select Malting CW/CE Two-row	Any selected variety of the class Barley, Canada Western/Eastern Malting Two-row designated as such by Order of the Commission	N/A	Nil	2.0	0.2	0.1	Nil	0.025	0.01	0.025	0.02	0.2	Nil
	Select Malting CW/CE Six-row	Any selected variety of the class Barley, Canada Western/Eastern Malting Six-row designated as such by Order of the Commission	N/A	Nil	2.0	0.2	0.1	Nil	0.025	0.01	0.025	0.02	0.2	Nil
Hulless	Select Malting CW/CE Two-row Hulless	Any selected variety of the class Barley, Canada Western/Eastern Malting Two-row Hulless designated as such by Order of the Commission	5	Nil	2.0	0.2	0.1	Nil	0.025	0.01	0.025	0.02	0.2	Nil
	Select Malting CW/CE Six-row Hulless	Any selected variety of the class Barley, Canada Western/Eastern Malting Six-row Hulless designated as such by Order of the Commission	5	Nil	2.0	0.2	0.1	Nil	0.025	0.01	0.025	0.02	0.2	Nil
Grade if specs for Select Malting CW/CE Two-row / Six-row (Hulless) not met		Non designated varieties which are selected for malting purposes are only eligible for the grade <i>Barley, Sample Select Malting CW/CE Two-row/Six-row (Hulless) Account Variety</i>	Barley Sample Select Malting CW/CE Two-row / six-row Account Adhered Hulls	Barley Sample Select Malting CW/CE Two-row / six-row Account Fireburnt	Barley Sample Select Malting CW/CE Two-row / six-row Account Frost	Barley Sample Select Malting CW/CE Two-row / six-row Account Fusarium Damage	Barley Sample Select Malting CW/CE Two-row / six-row Account Heated	Barley Sample Select Malting CW/CE Two-row / six-row Account Rotted, Severely Mildewed	Barley Sample Select Malting CW/CE Two-row / six-row Account Admixture	Barley Sample Select Malting CW/CE Two-row / six-row Account Excreta	Barley Sample Select Malting CW/CE Two-row / six-row Account Admixture	2.5% or less– <i>Barley, Rejected (CW grade) Account Stones or Barley, Sample CE Account Stones Over 2.5%–Barley, Sample Salvage</i>	Barley Sample Select Malting CW/CE Two-row / six-row Account Admixture	Barley Sample Select Malting CW/CE Two-row / six-row Account Admixture

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

Note: If specs for Select CW/CE Hulless grade not met add "Hulless" to Sample grade name

**Barley, Canada Western/Canada Eastern Food (CW/CE)**

Grade name		Standard of quality			Damage					
		Varieties with adhered hulls %	Other hullless varieties %	Total adhered hulls %	Broken %	Fireburnt %	Frost %	Fusarium %	Heated, rotted, severely mildewed %	Sprouted %
Covered	Select Food CW/CE Two-row	n/a	-	-	4	Nil	2	0.5	0.2	N/A
	Select Food CW/CE Six-row	n/a	-	-	4	Nil	2	0.5	0.2	N/A
Hullless	Select Food CW/CE Two-row Hullless	Considered as other cereal grains	5	5	4	Nil	2	0.5	0.2	0.5
	Select Food CW/CE Six-row Hullless	Considered as other cereal grains	5	5	4	Nil	2	0.5	0.2	0.5
Grade, if Select food specs not met		50% or less– <i>Barley, Sample Select Food CW/CE Account Adhered Hulls</i>		<i>Barley, Sample Select Food CW/CE Account Adhered Hulls</i>	<i>Barley, Sample Select Food Broken Grain</i>	<i>Barley, Sample Select Food CW/CE Account Fireburnt</i>	<i>Barley, Sample Select Food CW/CE Account Frost</i>	<i>Barley, Sample Select Food CW/CE Account Fusarium</i>	<i>Barley, Sample Select Food CW/CE Account Heated</i>	<i>Barley, Sample Select Food CW/CE Account Sprouted</i>

Grade name		Foreign material						
		Ergot %	Excreta %	Inseparable seeds %	Other cereal grains %	Sclerotinia %	Stones %	Total %
Covered	Select Food CW/CE Two-row	0.02	0.01	0.2	2.0	0.02	0.02	2
	Select Food CW/CE Six-row	0.02	0.01	0.2	2.0	0.02	0.02	2
Hullless	Select Food CW/CE Two-row Hullless	0.02	0.01	0.2	2.0	0.02	0.02	2
	Select Food CW/CE Six-row Hullless	0.02	0.01	0.2	2.0	0.02	0.02	2
Grade, if Select food specs not met		<i>Barley, Sample Select Food CW/CE Account Ergot</i>	<i>Barley, Sample Select Food CW/CE Account Excreta</i>	<i>Barley, Sample Select Food CW/CE Account Admixture</i>	50% or less– <i>Mixed Grain, CW/CE Barley</i>	<i>Barley, Sample Select Food CW/CE Account Admixture</i>	2.5% or less– <i>Barley, Rejected (CW grade) Account Stones</i> or <i>Barley, Sample CE Account Stones Over 2.5%– Barley, Sample Salvage</i>	50% or less– <i>Mixed Grain, CW/CE Barley</i>

Note: Barley not selected for food will be graded according to "General Purpose" grades.

Note: If specs for Food CW/CE Hullless grade not met add "Hullless" to Sample grade name

## Barley, Canada Western/Canada Eastern General Purpose (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 %	Fusarium %	Heated, rotted, severely mildewed %	Sprouted %
		CW	CE									
Covered	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
Hulless	No.1 CW/CE Hulless	72 (352)	72 (352)	10	No limit	10	Reasonably sweet, may be frost-damaged, weather-stained or otherwise damaged	15	Nil	1.0	0.5	10
	No. 2 CW/CE Hulless	65 (314)	65 (314)	20	No Limit	20	Fairly sweet, excluded from other grades of barley on account of immature or severely damaged kernels	25	0.5	1.0	2.5	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 Damage</i>	<i>Barley, Sample CW/CE Account Heated</i>	<i>Barley, Sample CW/CE Account Sprouted</i>

Grade name		Foreign material							Total %
		Ergot %	Excreta %	Inseparable seeds %	Other cereal grains %	Sclerotinia %	Stones %	Wild oats %	
Covered	No. 1 CW/CE	0.05	0.020	0.2	<u>2.5</u>	0.05	<u>0.15</u>	1	<u>2.5</u>
	No. 2 CW/CE	0.1	0.020	0.2	8	0.1	<u>0.15</u>	<u>2.5</u>	10
Hulless	No. 1 CW/CE Hulless	0.05	0.020	0.2	2.5	0.05	0.15	1	2.5
	No. 2 CW/CE Hulless	0.1	0.020	0.2	8	0.1	0.15	2.5	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>	50% or less– <i>Mixed Grain CW/CE Barley</i>	<i>Barley, Sample CW/CE Account Admixture</i>	2.5% or less– <i>West - Barley, Rejected (CW grade) Account Stones or East - Barley Sample CE Account Stones Over 2.5%– Barley, Sample Salvage</i>	50% or less– <i>Mixed Grain CW/CE Barley</i>	50% or less– <i>Mixed Grain CW/CE Barley</i>

Note: If specs for CW/CE Hulless grade not met add "Hulless" to Sample grade name



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## 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 elevators, dockage is reported to the nearest:

- 0.1% for samples representing shipments loaded from a single terminal elevator
- 0.01% for composite samples representing shipments loaded from more than one terminal elevator.

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

### Grading

Western malting and food 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, chaff and roughage %
Select Malting/Food CW two-row	0.1	0.3
Select Malting/Food CW six-row	0.1	0.3

Grade name	Foreign material									
	Commercial cleanliness		Ergot %	Inseparable seeds %	Other cereal grains %	Mineral matter		Sclerotinia %	Wild oats %	Total %
	(1) Small seeds %	(2) Total, small seeds, attrition, dust, chaff and roughage %				Stones %	Total %			
No. 1 CW	0.1	0.3	0.05	0.2	<u>2.5</u>	<u>0.15</u>	<u>0.25</u>	0.05	1	<u>2.5</u>
No. 2 CW	0.1	0.3	0.1	0.2	8	<u>0.15</u>	<u>0.25</u>	0.1	<u>2.5</u>	10

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

The area inside dashed lines refers to factors which are assessed in determining commercial cleanliness.