Canadian Grain Commission | Commission canadienne des grains

ISSN 1704-5118

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

2. Moisture testing

Introduction to moisture testing

Moisture testing means analyzing a grain sample for the percentage of moisture contained within it.

Moisture content can affect the test weight and the appearance of the grain. Grain that is too moist is susceptible to deterioration.

Moisture tests are performed on samples free of dockage.

Industry Services will determine the moisture content of grain using either NIT, a Model 1200A moisture meter or Model 919/3.5 moisture meter. Specific Work Instructions for moisture testing are available to CGC staff at K:\Isqms\Work Instructions-Instructions de travail\National-Nationale\English.

Moisture Specifications

The chart on the next two pages outlines the moisture specifications and conversion tables for each type of grain and lists the representative portion required to determine the moisture content of the sample.

Conversion tables are not available for all grains.

- For wheat, oats and barley samples with low test weight, see *Estimating moisture content for lightweight wheat, oats and barley samples* on page 2-5.
- For samples with moisture values above the range of the conversion table, see *Estimating moisture content for high moisture samples* on page 2-7
- For beans for which there are no conversion charts, see *Estimating moisture content for beans with no conversion table* on page 2-8.
- For other grains, see *Determining moisture content for special cases* on page 2-9.

Conversion tables for use with the Model 919/3.5" moisture meter

Grain	Weight (g)	Conversion table number	Tough (%)	Damp (%)
Wheat				
CWRS	250	10 (66 kg/hl and over)	14.6-17.0	over 17.0
lightweight	225	9 (less than 66 kg/hl)	14.6-17.0	over 17.0
CWHWS, CEHWS	250	1	14.6-17.0	over 17.0
CWES	250	2	14.6-17.0	over 17.0
CWSWS, CESWS	250	3	14.6-17.0	over 17.0
CWRW	250	5	14.6-17.0	over 17.0
CER	250	1	14.6-17.0	over 17.0
CERS	250	1 CERS	14.6-17.0	over 17.0
CEHRW	250	1 CEHRW	14.6-17.0	over 17.0
CESRW	250	1 CESRW	14.6-17.0	over 17.0
CWAD, CEAD	250	4	14.6-17.0	over 17.0
CPSR, CPSW	250	1	14.6-17.0	over 17.0
Oats	200	6	13.6-17.0	over 17.0
Oats lightweight	140	1 (less than 48 kg/hl - calibrate at 73)	13.6-17.0	over 17.0
Barley				
Select	225	13 (52 kg/hl or over)	13.6-17.0	over 17.0
General purpose	225	13 (52 kg/hl or over)	14.9-17.0	over 17.0
lightweight	200	10 (under 52 kg/hl)	14.9-17.0	over 17.0
Hulless	225	1	14.9-17.0	over 17.0
Rye	250	5	14.1-17.0	over 17.0

Conversion tables for use with the Model 919/3.5" moisture meter (continued)

Grain	Weight (g)	Conversion table number	Tough (%)	Damp (%)
Flaxseed and solin	225	6	10.1–13.5	over 13.5
Canola and rapeseed	250	5	10.1–12.5	over 12.5
Mustard seed, all classes	250	11 - brown mustard 10 - oriental mustard 9 - yellow mustard	9.6–12.5	over 12.5
Peas, green and yellow	250	2	16.1–18.0	over 18.0
Split peas, green and yellow	250	1	16.1–18.0	over 18.0
Chick peas	250	1	14.1-16.0	over 16.0
Pea beans	250	2	no tough	over 18.0
Lentils (Green)	250	1	14.1-16.0	over 16.0
Lentils (Red)	250	1	13.1-16.0	Over 16.0
Peas, green and yellow	250	2	16.1–18.0	over 18.0
Beans				
Black	250	2	no tough	over 18.0
Cranberry	225	2	no tough	over 18.0
Faba	250	2	16.1–18.0	over 18.0
Dark red kidney	250	2	no tough	over 18.0
Pinto	250	2	no tough	over 18.0
Buckwheat	225	3	16.1-18.0	over 18.0
Triticale	250	1	14.1-17.0	over 17.0
Mixed grain	Use the conversion table and tough and damp ranges for the predominant grain.			

Grain	Weight (g)	Conversion table number	Tough (%)	Damp (%)	Moist (%)	Wet (%)
Corn	250	to 20.0—6	15.6– 17.5	17.6–21.0	21.1–25.0	over 25.0
	175	20.1–35.0—11A (used with 11B, Corn Test Weight Adjustment Table)				
Soybeans	225	8	14.1–16.0	16.1– 18.0	18.1–20.0	over 20.0
Sunflower seed	150	3 (calibrate at 73)	9.6–13.5	13.6– 17.0	17.1–22.0	over 22.0
Safflower seed	150	1 (calibrate at 73)	9.6–13.5	13.6–17.0	17.1–22.0	over 22.0

Estimating moisture content for lightweight wheat, oats and barley samples

Use these procedures for lightweight wheat, oats and barley samples.

- Canada Western Red Spring (CWRS) wheat is light weight if the test weight is less than 66 kg/hL or 320 g/0.5 L.
- Oats are lightweight if the test weight is less than 48 kg/hL or 220 g/0.5 L.
- Barley is lightweight if the test weight is less than 52 kg/hL or 250 g/0.5 L.
- Samples of wheat, oats and barley are also considered lightweight if grain touches the surface of the inverted cone portion of the cell post in the measuring cell.

Normal procedures for determining moisture content will give inaccurate results with light weight samples.

CWRS wheat, oats and barley

Conversion tables are available for lightweight Canadian Western Red Spring, oats and barley. See *Choosing a conversion table.*

Other wheats

These are the procedures for estimating the moisture content of lightweight samples of Canada Western Soft White Spring (CWSWS), Canada Western Hard White Spring (CWHWS), Canada Western Red Winter (CWRW), and Canada Western Amber Durum (CWAD), Canada Western Extra Strong (CWES), and Canada Prairie Spring Red or Canada Prairie Spring White (CPSR and CPSW) wheat.

1. Use a 225-g sample with the appropriate temperature.
2. Determine the moisture using Moisture Conversion Table No. 9 (Canada Western Red Spring wheat, test weight less than 66 kg/hL).
3. Subtract or add depending upon the correction factor for the appropriate class by moisture range according to the following table.

Correction factors

Moisture range (%)	CWSWS[1]	CWRW[2]	CWAD[3]	CWES[4]	CPSR/CPSW[5]	CWHWS[6]
10.0 - 12.0	+0.3	–0.1	–0.4	–0.2	+0.2	-0.1
12.1 - 14.0	+0.1	–0.3	–0.6	–0.3	0.0	-0.1
14.1 - 16.0	0.0	–0.5	–0.8	–0.4	–0.3	-0.1
16.1 - 18.0	–0.1	–0.6	–0.9	–0.5	–0.5	-0.2
18.1 - 20.0	–0.2	–0.8	–1.1	–0.6	–0.7	-0.2

1 Canada Western Soft White Spring
2 Canada Western Red Winter
3 Canada Western Amber Durum
4 Canada Western Extra Strong
5 Canada Prairie Spring Red/White
6 Canada Western Hard White Spring

Example

Step	Example
1. Use a 225-g sample with the appropriate temperature.	1. A 225-g sample of light weight CWSWS wheat gives a meter reading of 40.0 at 15°C.
2. Determine the moisture using Moisture Conversion Table No. 9 (Canada Western Red Spring wheat, weight less than 66 kg/hL).	2. Conversion Chart No. 9 (CWRS wheat, test weight less than 66 kglhL) gives a percentage moisture of 16.2.
3. Add or subtract the correction factor from the chart for the appropriate class . according to the moisture range.	3. The correction factor from the Correction factors table is -0.1. The corrected moisture for the light weight sample is (16.2 - 0.1) or 16.1%

Estimating the moisture content of high moisture samples

If the moisture meter dial reading on a sample is higher than those on the moisture conversion table, use the following procedure to **estimate** moisture content.

1. Accurately, to two decimal places, weigh a sample larger than the quantity required for testing according to the appropriate sample weight on pages 2-6 and 2-7.

   For example, for CWRS, use 300 g, not 250 g.

2. Spread the sample on paper and let it dry at room temperature until a reading can be obtained.
3. Reweigh the sample.
4. Calculate the percentage weight loss.

   A = original sample weight
   B = sample weight after air drying
   C = percentage loss in weight during drying

   $$\frac{(A-B)}{A} \times 100 = C$$

5. Mix the sample thoroughly.
6. Weigh out the amount required for a meter test.
7. Determine the temperature of the sample.
8. Follow the procedures on page 2-4 to determine the moisture content. (=D)
9. Determine the total moisture content of the sample using the following formula.

   C = percentage by weight of moisture loss on air drying (step 4)
   D = Moisture content determined by meter (step 8)

   $$\textit{Percentage moisture by weight} = \left[(100 - c) \times \frac{D}{100}\right] + C$$

10. Report the result to the nearest 0.1 %.

Note: to improve the accuracy of the moisture test, the sample should be returned to a plastic bag an be allowed to equilibrate for several hours after pre-drying

Estimating moisture content for beans with no conversion tables

Azuki beans

1. Using a Boerner-type divider, divide a 250-g representative portion.
2. Determine moisture content using cranberry bean conversion table No. 2.
3. Subtract 2.5 from the table result.

Dutch brown beans

1. Determine sample size and moisture content from pea bean conversion table No. 2.
2. Subtract 1.1 from the table result.

White kidney beans

1. Use the dark red kidney bean conversion table No. 2 to determine the size of the representative portion and the moisture content.
2. Add 0.5 to the table result

Great northern white beans

1. Determine sample size and moisture content from pea bean conversion table No. 2.
2. Subtract 1.4 from the table result.

Kintoki beans

Use dark red kidney bean conversion table No. 2 to determine the size of the representative portion and the moisture content.

Light red kidney beans

Use the dark red kidney bean conversion table No. 2 to determine the size of the representative portion and the moisture content.

Otebo beans

1. Determine sample size and moisture content from pea bean conversion table No. 2.
2. Subtract 0.3 from the table result.

Pink beans

1. Determine sample size and moisture content from pea bean conversion table No. 2.
2. Subtract 1.1 from the table result.

Small red beans

1. Divide a sample of 250 g.
2. Use the following regression formula, where

   T = sample temperature (°C):
   % moisture = 0.155 x meter reading + 8.03 + {0.l x (22 - T)}

Example

The pea bean conversion table No. 2 shows a sample of 250 g is required.
A sample of great northern white beans shows a meter reading of 25 at 18°C. According to the table, the moisture content for pea beans at this reading is 13.6%.
To adjust this moisture content for great northern white beans, subtract 1.4.
The moisture content of the great northern white beans is 13.6-1.4, or 12.2.

Determining moisture content for special cases

Optional analysis

An optional analysis is the process of determining the weight and grade of grain which would otherwise be assessed as dockage. If a sufficient quantity of grain is available, a moisture test will be done on all grains assigned a grade as part of the optional analysis.

When the grain assigned a grade as part of the optional analysis is not large enough for official moisture testing, and most of the sample is tough, damp, moist or wet, the optional analysis portion is graded tough, damp, moist, or wet without reference to a specific moisture content.

Corn

See *Determination of dockage* for corn.

1. Remove foreign material and cracked corn.

If the moisture content is...	Use this sieve...
25.0% or less	No. 12 round-hole
25.1 % or more	No. 14 round-hole

2. Choose the appropriate sample size by weight.

If the moisture content is...	Use a sample size of...
under 20.0%	250 g
from 20.0% to 35.0%	175 g

3. Choose the conversion table.

If the moisture content is...	Use conversion table...
20.0% or less	6
from 20.1% to 35.0%	Moisture Meter Model 919/3.5” 11A - to estimate moisture content based on the dielectric reading and the temperature of the corn 11B - to adjust the preliminary moisture value according to the test weight of the corn sample Moisture Meter 1200A 11B-1200A – to adjust the preliminary moisture value according to the test weight of the corn sample