



Canadian Grain  
Commission

Commission canadienne  
des grains

# **Model AM 5200-A Moisture Meter Operation and Maintenance**

**Standard Operating Procedure  
AC04.600.v2**

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## 1.0 Purpose

Determining the moisture content of Canadian grains is important for grain quality, safety, and storage. This document has been developed to ensure consistent and accurate operation and maintenance of the PerkinElmer (Perten) Model AM 5200-A Moisture Meter throughout the Canadian Grain Commission.

## 2.0 Abbreviations and definitions

- 2.1 CCFM – Cracked Corn and Foreign Material
- 2.2 CWRS – Canada Western Red Spring Wheat
- 2.3 GRL – Grain Research Laboratory
- 2.4 IS – Industry Services
- 2.5 Official Sample – A sample of grain taken from a parcel of grain by a person authorized by the Canadian Grain Commission to take the sample or by any sampling device authorized by the Canadian Grain Commission.
- 2.6 OGGG – Official Grain Grading Guide
- 2.7 QSO – Quality System Occurrence
- 2.8 Submitted Sample – An unofficial grain sample sent to the Canadian Grain Commission for testing, usually from grain producers and grain companies. This sample was not obtained by a Canadian Grain Commission authorized sampling device or person.
- 2.9 Vessel Sample – An official sample.

## 3.0 Health and Safety

- 3.1 The Canadian Grain Commission's Health and Safety Program complies with the Canada Labour Code Part II and the Canada Occupational Health and Safety Regulations. Contact the Manager, Health and Safety, for further details.
- 3.2 Refer to the applicable equipment and instrument operation manuals for manufacturer recommended safety precautions.
- 3.3 Review applicable Safety Data Sheet (SDS) information for chemicals prior to use.
- 3.4 Review applicable Job Safety Analysis (JSA) procedures before testing.
- 3.5 Wear appropriate personal protective equipment (PPE).

## 4.0 Responsibilities

- 4.1 Technicians are responsible for processing samples submitted to the laboratory.
- 4.2 Inspectors are responsible for processing samples pertaining to inspection and submitted sample activities.
- 4.3 The Moisture Lab Supervisor (or delegate) is responsible for training the staff and overseeing operations.

## 5.0 Equipment and materials

### Instrumentation

- 5.1 AM 5200-A moisture meter

### Equipment

- 5.2 Canned air or equivalent
- 5.3 No. 9 slotted sieve

## 6.0 Required training

- 6.1 Laboratory staff must read and acknowledge this procedure in SoftExpert Suite (SES) and complete applicable sections of AC06.610 before work commences.
- 6.2 Non-laboratory staff, such as inspection staff, are encouraged to complete AC06.610 before commencing work. However, the requirement to complete training is at the discretion of managers/supervisors.

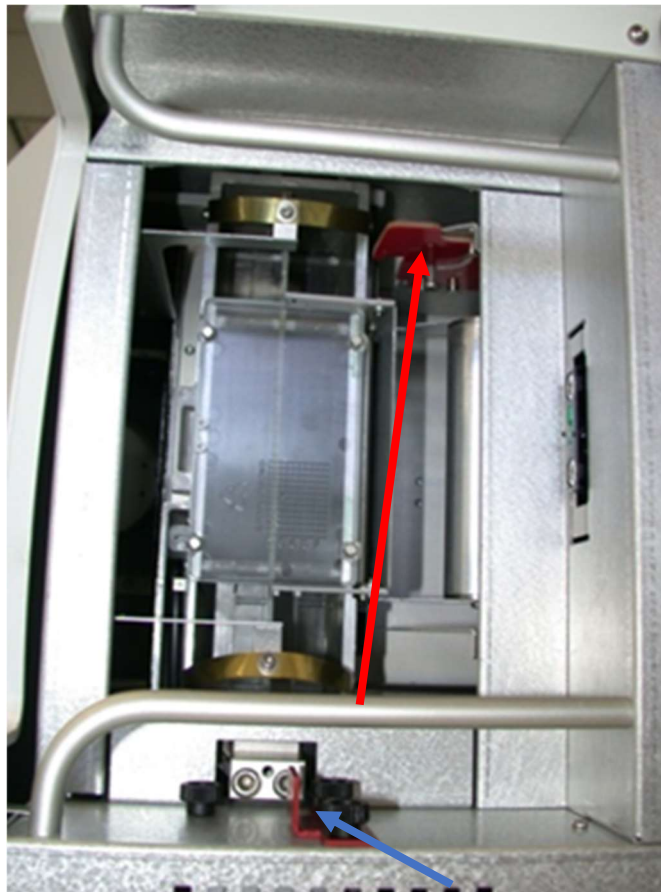
## 7.0 Procedure

### Preparation for Transport

- 7.1 When transporting a moisture meter to a location without other moisture meters, run the same sample before and after transport.
  - 7.1.1 Run a sample on the moisture meter. Note the moisture result on the bag and reseal the bag to maintain the current moisture level in the sample.
  - 7.1.2 Take the sample to the location where the moisture meter is going to be set up. This sample will be used as a verification sample after transport to ensure the moisture meter is performing consistently and is not affected by transport.
- 7.2 When transporting a moisture meter to location where other moisture meters are available, run a sample on both meters for comparison.
  - 7.2.1 Run and compare the same sample on a moisture meter which has not been transported and is known to be in good working condition, and on the moisture meter which has been transported.

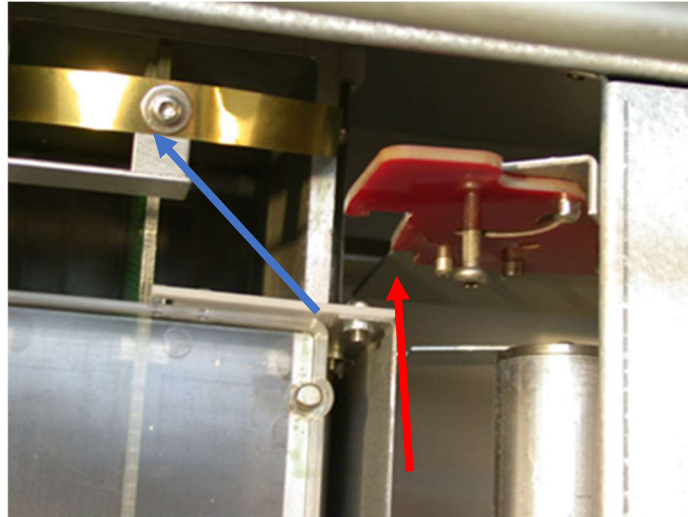
### Meter Set-up for Transport

- 7.3 Turn the meter off and unplug.
- 7.4 Remove the catch drawer.
- 7.5 Place the meter on its left side.
- 7.6 To lock the transport locks:
  - 7.6.1 Figure 1 indicates the positions of the two transport locks in the unlocked position.



**Figure 1.** Transport lock #1 (red arrow) and #2 (blue arrow).

- 7.6.2 Transport lock #1: Pull down, to the left and then up to hook the lock onto the bar and into the locked position (Figures 2A, 2B). Ensure that the lock is positioned around the locking pin. Avoid bringing hands near the sharp, copper-coloured metal bands.

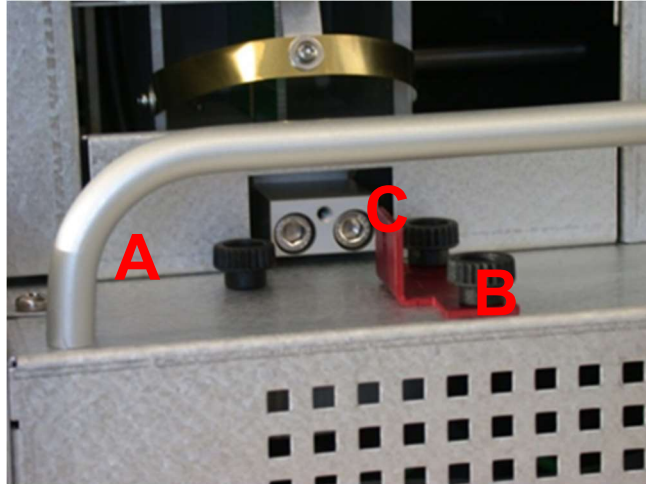


**Figure 2A.** Transport lock #1 in unlocked position. Note the locking pin (red arrow) and metal bands (blue arrow).

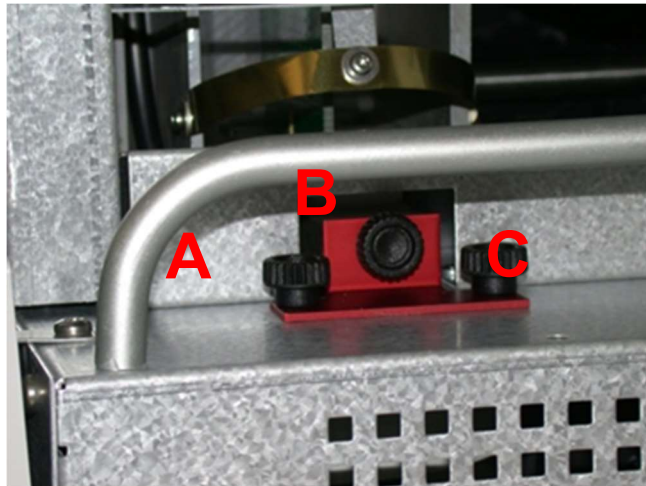


**Figure 2B.** Transport lock #1 in locked position.

- 7.6.3 Transport lock #2: Remove thumbscrews A + B; loosen C (Figure 3A). Shift the red bracket to the locked position (Figure 3B). Tighten screw C; replace screw A in original position; place screw B in locked position. Ensure all thumbscrews are snug, but not tight.



**Figure 3A.** Thumbscrew configuration of transport lock #2 in unlocked position.



**Figure 3B.** Thumbscrew configuration of transport lock #2 in locked position.

- 7.7 Return meter to upright/working position.
- 7.8 Return catch drawer.
- 7.9 Package the meter and the power cable into its foam frame and transport container (either original shipping box or black Pelican case).

### Meter Set-up at Location

- 7.10 Remove meter from transport container and remove foam frame.
- 7.11 Remove the catch drawer.
- 7.12 Place the meter on its left side.

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- 7.13 Unlock transport locks 1 and 2 by reversing the process outlined in “Meter Set-up for Transport.”
- 7.14 Return the meter to upright/working position.
- 7.15 Return the catch drawer.

### Leveling the Meter

- 7.16 Remove the top cover by pushing up along the back of the meter. The levelling air bubble is located near the front of the meter in the middle.
- 7.17 Adjust the meter’s feet to move the air bubble so that it is entirely within the red circle.
- 7.18 Replace the top cover ensuring that it is snapped into place. The meter will not operate if the top cover is not secured properly.

### Turning the Meter On

- 7.19 Plug in the moisture meter.
- 7.20 Turn the moisture meter on using the switch at the back. A self-test will automatically start.
- 7.21 A window will appear with the warning: “Please make sure catch drawer is empty.” Check to ensure the catch drawer is empty and completely inserted. The drawer is held in place by magnets.
- 7.22 Press CLOSE on the warning.
  - 7.22.1 If the “Check scale for interference error” appears, turn the meter back off and confirm that it is unlocked. Contact GRL Moisture Laboratory and/or Regional Laboratory to make arrangements for troubleshooting the error message. Contact your Regional Inspection Manager to communicate status of instrument and planned actions.
- 7.23 If this is the initial use of the moisture meter following transportation, verify it following the applicable steps in the “Preparation for Transport” section.
  - 7.23.1 The result from the verification sample must meet tolerances in the ‘Quality Control’ section to proceed with testing.
  - 7.23.2 For more information on verification, contact the GRL Moisture Laboratory and/or Regional Laboratory.

### Analyzing Samples

- 7.24 Ensure samples have been cleaned according to procedures stated in the Official Grain Grading Guide (OGGG): “Moisture tests are performed on samples free of dockage. Moisture tests on corn are performed after the removal of cracked corn and foreign material (CCFM).”
  - 7.24.1 If the sample is not free of dockage or contains CCFM, follow the instructions in the OGGG for cleaning the sample.
- 7.25 Ensure samples are at ambient temperature prior to testing.



- 7.26 Mix all samples thoroughly prior to testing to ensure a representative sample is taken.
  - 7.26.1 For samples weighing 1.5 kg or less, mixing using a figure-8 motion is preferred.
- 7.27 On the moisture meter, toggle through the tab/ lists to select the appropriate commodity.
- 7.28 Pour the cleaned sample into the funnel at the top of the meter until the sample reaches the metal crossbars or the bottom of the funnel opening to eliminate any air pockets, ensuring that the four optical sensors are covered to trigger the automatic process.
  - 7.28.1 If the automatic process is not triggered when using large seeded commodities such as beans or corn, eliminate any air pockets from around the sensors that may be preventing the automatic process from triggering.
- 7.29 The meter will automatically analyze the sample and dump the sample into the catch drawer when it is finished.
- 7.30 The calculated moisture result and sample temperature will be displayed on the screen. Record results in the appropriate worksheet or app, as described in the “Reporting Results” section of this procedure.
  - 7.30.1 All submitted samples must be run in duplicate and reported as an average of two samples on form AC06.612.
- 7.31 Empty the catch drawer.
- 7.32 Once the catch drawer is returned, the results will clear and the display will change back to the “Please pour the sample” screen for the same commodity that was just run through the meter.
- 7.33 To select a different product, press the “Cancel” button to return to the product list and repeat analysis.
- 7.34 Turn the meter off every day for a minimum of 15 minutes. This ensures that the internal self-test is done on a daily basis.

## 8.0 Quality control

- 8.1 Ensure a monthly moisture check is performed on each moisture meter. Refer to procedure AC04.608 Moisture Check Test - Monthly Analysis.
- 8.2 For vessel samples, follow the OGGG instructions for samples testing within 0.5 % (+) or (-) of the tough, damp, moist, or wet cut off levels.
- 8.3 For submitted samples, accept and report results only if the results of the duplicates are within the tolerance limits below:

| Commodity  | Tolerance                 | Tolerance Moisture Level |
|------------|---------------------------|--------------------------|
| All Pulses | 0.2 % in moisture content | 22 % Moisture            |

|                         |                           |                |
|-------------------------|---------------------------|----------------|
| All Oilseeds            | 0.2 % in moisture content | 22 % Moisture  |
| All Cereals except Oats | 0.2 % in moisture content | 22 % Moisture  |
| Oats                    | 0.3 % in moisture content | 22 % Moisture  |
| Corn                    | 0.3 % in moisture content | 25 % Moisture  |
| Corn                    | 0.5 % in moisture content | >25 % Moisture |

8.3.1 If the difference in results is greater than the above tolerance limits, run the sample a third time and take the average of the two closest results. For example:

8.3.1.1 First result for a wheat sample is 14.5 % and second result is 14.0 %.

8.3.1.2 The difference between the two results is greater than 0.2 %.

8.3.1.3 A third result yields 14.2 % (within the 0.2 % tolerance to the second result).

8.3.1.4 The average moisture for second result and third result for the wheat sample is 14.1 %.

8.4 If any of the criteria is not met for submitted samples:

8.4.1 Do not release the results.

8.4.2 If the spread is larger than the above tolerances throughout the 3 results, remix the sample and reanalyze the sample.

8.4.3 If the spread continues to be larger than the above tolerances, contact GRL Moisture Laboratory and/or Regional Laboratory staff for troubleshooting.

8.4.4 For laboratory staff to document quality issues, initiate a QSO report in SES, if required, following procedure AC04.127.

## 9.0 Reporting results

9.1 For submitted samples, enter the results in AC06.612 Moisture Submitted Sample Results. Enter the average result into the SOS app.

9.1.1 Results must be reviewed prior to release.

9.2 For vessel samples, enter the results in the OSCAR app.

## 10.0 Cleaning and maintenance

### Cleaning

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- 10.1 Do not use a vacuum cleaner, high pressurized air or sharp implements to clean the moisture meter.
- 10.2 For light cleaning, use canned air or equivalent to dislodge dust from the sample cell and surrounding areas.
- 10.3 Thoroughly clean the moisture meter on a monthly basis.
  - 10.3.1 Weekly cleaning may be required during high volume testing, such as between vessels.
  - 10.3.2 Moisture meters must be cleaned after analyzing infested samples.
  - 10.3.3 Moisture meters must be cleaned after receiving error messages or if sample results exceed suitable tolerances.
- 10.4 On the touchscreen of the moisture meter, press **MENU → General Settings → Maintenance → Clean → Open Funnel**. This opens the funnel to allow access to the inside of the cell for cleaning.
- 10.5 Turn moisture meter off.
- 10.6 Lift the top cover from the back to expose the funnel.
- 10.7 Inspect the four sensors inside the funnel for debris buildup and confirm they are connected (outside the funnel). Use canned air or equivalent to gently remove any dust buildup.
- 10.8 Remove the catch drawer.
- 10.9 Tilt the funnel back to access the measurement cell (funnel is connected by magnets at the front) and gently clean using canned air or equivalent.
  - 10.9.1 When the funnel is tilted back, you will have access to a compartment and a dividing plate. This is a sensitive sensor; clean around it with care.
- 10.10 Check the bottom plastic plate (RF lid) for dirt buildup.
- 10.11 Replace the catch drawer.
- 10.12 Replace the top cover.
- 10.13 For more thorough cleaning (once a month or more frequently if necessary), lay the meter on its left side with the display closest to the surface it is sitting on.
  - 10.13.1 Remove the catch drawer.
  - 10.13.2 Use canned air or equivalent to remove debris buildup.
  - 10.13.3 Return the meter to its upright position.
- 10.14 Turn the moisture meter back on.
- 10.15 This will automatically release any free-flowing debris into the catch drawer and close the funnel.
- 10.16 Clean out the catch drawer, removing any material that may be lodged in the crevasses. Canned air or equivalent may be used to blow out the debris.
- 10.17 Record cleaning and maintenance activities in AC06.613 Instrument Cleaning Form.

## Maintenance

- 10.18 When maintenance is required, contact the GRL Moisture Laboratory or Regional Laboratory for more information.

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- 10.18.1 The moisture meter must be verified after maintenance and repair. Follow the direction from the GRL Moisture Lab or Regional Laboratory.

### **Grain Calibration Updates**

- 10.19** Moisture meter grain calibrations are updated yearly as directed by the GRL Moisture Laboratory. Refer to procedure AC04.610 UGMA Grain Calibration Update.

## **11.0 References**

- 11.1** AC04.127 Quality System Occurrence
- 11.2** AC04.608 Moisture Check Test - Monthly Analysis
- 11.3** AC04.610 UGMA Grain Calibration Update
- 11.4** AC06.610 Moisture Lab - Moisture Meters Training Record
- 11.5** AC06.612 Moisture Submitted Samples Results
- 11.6** AC06.613 Instrument Cleaning Form
- 11.7** Official Grain Grading Guide