



Canadian Grain
Commission

Commission canadienne
des grains

Moisture Check Test Monthly Analysis

**Standard operating procedure
AC04.608.v2**

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1.0 Purpose

This document has been developed to ensure consistent and accurate moisture results of the models AM 5200-A and GAC 2700 moisture meters for all official Canadian grains, and FOSS grain analyzers for barley, oats, soybeans and wheat grains. The moisture meters use capacitance principles to predict moisture content, while the FOSS grain analyzers use near infrared technology by transmittance mode to predict moisture content.

2.0 Abbreviations

- 2.1 UGMA – Unified Grain Moisture Algorithm; this type of moisture meter includes the models AM 5200-A (PerkinElmer) and GAC 2700 (DICKEY-john) only

3.0 Responsibilities

- 3.1 The chemistry advisor and GRL Moisture Technicians (or delegate) are responsible for training the staff and overseeing operations.
- 3.2 Inspectors and laboratory staff are responsible for running the moisture check monthly. Moisture checks are to be analyzed by those who regularly use the moisture meter at your location.

4.0 Health and safety

- 4.1 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.
- 4.2 Refer to the applicable equipment and instrument operation manuals for manufacturer recommended safety precautions.
- 4.3 Review applicable Safety Data Sheet (SDS) information for chemicals prior to use.
- 4.4 Review applicable Job Safety Analysis (JSA) procedures before testing.
- 4.5 Wear appropriate personal protective equipment (PPE).

5.0 Equipment and materials

Instrumentation

- 5.1 AM 5200-A moisture meter (PerkinElmer)
- 5.2 GAC 2700 moisture meter (DICKEY-john) – headquarters only
- 5.3 FOSS grain analyzer
- 5.4 Balance (scale) capable of reading up to 1000g with two-decimal accuracy

Equipment

- 5.5 Red beads – headquarters only
- 5.6 No. 9 slotted sieve – headquarters only
- 5.7 Canned air, air duster (Koonie), or equivalent

Reference material

- 5.8 Check test sample

6.0 Required training

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

7.0 Procedure

- 7.1 Balance performance shall be verified at least daily prior to use. Complete forms AC06.081 or I-48. Refer to AC04.205 Operation of Laboratory Balances or IEQ-7 Electronic Bench Scales.

Prior to sample analysis

- 7.2 The monthly moisture check test is to be completed within 1 week of receiving it at the testing location.
 - 7.2.1 Samples may not be shipped directly to the final testing location. For example, samples are shipped to Vancouver central office and distributed from there to all the Vancouver testing locations.
- 7.3 Access the AC06.614 Moisture Meter Monthly Check Template specific for each location.
 - 7.3.1 Open the “MOISTURE” folder on the “ischecktests” drive.
 - 7.3.2 Select the appropriate location folder.
 - 7.3.3 Terminal locations in Vancouver and office locations in Winnipeg are listed as subfolders.
 - 7.3.4 Rename a copy of the template “CT Template AC06.614” as the appropriate moisture check test number and save it in the same folder (see “Results Report” section 9.1). For example, for check test sample 100, the file would be renamed as **CT 100**.
 - 7.3.5 Enter the check test number at the top of the form.
- 7.4 Clean the instrument according to the appropriate procedure:
 - 7.4.1 AC04.600 Model AM 5200-A Moisture Meter Operation and Maintenance

- 7.4.2 AC04.601 Model GAC 2700 Moisture Meter Operation and Maintenance (headquarters only)
- 7.4.3 AC04.521 Protein and Oil Determination using the FOSS Grain Analyzer
- 7.5 Record the date of cleaning and the initials of the technician or inspector who cleaned each moisture meter in the spreadsheet under **Part 1: Cleaning**.
- 7.6 Ensure the balance has been verified before proceeding. Refer to AC04.205 or IEQ-7.
- 7.7 Remove the check test sample from the outer bag and weigh the sample and inner bag. In the spreadsheet under **Part 2: Weigh moisture sample + inner bag**, enter the bag number (**Bag #**), weight listed on the bag (**Given wt**), and the current weight of the sample and inner bag (**Tested wt**).
 - 7.7.1 If the weight difference between the 2 measurements exceeds $\pm 0.5\text{g}$, do not continue and contact the GRL moisture lab for further instructions.

NOTE: For headquarters only, complete the “System check for AM 5200-A” section of this procedure (steps 7.17-7.22) below before the “Analyzing moisture check test sample” section.

Analyzing moisture check test sample

- 7.8 Analyze the moisture check test sample three times according to the appropriate procedure: AC04.600, AC04.601, or AC04.521.
 - 7.8.1 Headquarters only: Label sample ID as CT XXX on the AM 5200-A and GAC 2700.
- 7.9 Record the moisture and temperature (if applicable) on the Moisture meter monthly check form, AC06.614, for each instrument according to the serial number under **Part 3: Measure sample check moisture and temperature**.

Grain weight check for AM 5200-A

- 7.10 Navigate to the grain weight check on the AM 5200-A moisture meter by pressing **MENU → General Settings → Maintenance → Grain Weight Check**.
- 7.11 Pour the moisture check test sample into funnel until the sensors are covered. The AM 5200-A will automatically start the test.
- 7.12 The test will fill the sample cell and strike off excess sample. Only the excess sample will drop into the catch drawer at this time.
- 7.13 When prompted, empty the excess sample found in the catch drawer and return the catch drawer to its place. Ensure there is no sample lodged in the catch drawer.

- 7.14 When the drawer is returned, press **Finish**. The sample will drop into the catch drawer. Record the weight given as “Meter Weight” on form AC06.614 under **Part 4: Measure grain weight check**.
- 7.15 Weigh the sample from the previous step on an external verified electronic balance. Record this weight as “Scale Weight” on form AC06.614.
- 7.16 Repeat steps 7.11 to 7.15 for a total of 3 times.

System check for AM 5200-A (headquarters only)

- 7.17 Select **System Check** from the **Full** product screen tab on the AM 5200-A moisture meter.
- 7.18 Enter the check test number as the Sample ID (e.g., CT 100).
- 7.18.1 Press the white box beside **Sample ID**.
 - 7.18.2 Use the keyboard to type in the check test number.
 - 7.18.3 Press the green arrow to enter.
- 7.19 Place the felt in the catch drawer and pour the red beads into the funnel.
- 7.19.1 Red beads should be free of dust and kept in a sealed container between tests.
 - 7.19.2 If a light coating of dust is observed on the beads, tumble them on a No. 9 slotted sieve for several seconds to dislodge the dust.
 - 7.19.3 If a heavy coating of dust is observed, contact the moisture lab supervisor.
- 7.20 Run the beads through the moisture meter three times.
- 7.20.1 The beads should automatically drop when the drawer is in place. If they do not, press **Go**.
- 7.21 After the third time, press **DONE** to display the results.
- 7.21.1 Results should fall between 9.8 and 10.2% moisture and 59.5 and 60.5 kg/hl test weight.
 - 7.21.2 If the results are not within specification, clean the beads and repeat steps 7.18 to 7.20.
 - 7.21.3 If results are still not within specification, contact the moisture lab supervisor.
- 7.22 Record results in form AC06.614 within the **System check (moisture lab only)** area under **Part 1**.

Grain weight check for GAC 2700 (headquarters only)

- 7.23 Navigate to the grain weight check on the GAC 2700 moisture meter by pressing the three lines in the top left corner. Select **Diagnostics** and then **Check Scale**.
- 7.24 Press the **Measure** button in the bottom right. The screen will read “Fill the hopper with sample.”
- 7.25 Pour the check test sample into funnel until the sensors are covered.
- 7.26 The test will fill the sample cell and strike off excess sample. Only the excess sample will drop into the catch drawer at this time.

- 7.27 When prompted, empty the excess sample found in the catch drawer and return the catch drawer to its place. Ensure there is no sample lodged in the catch drawer.
- 7.28 When the drawer is returned, press **Dump Sample**. The sample will drop into the catch drawer. Record the weight given as “Meter Weight” on form AC06.614 under **Part 4: Measure grain weight check**.
- 7.29 Weigh the sample from the previous step on an external balance. Record this weight as “Scale Weight” on form AC06.614.
- 7.30 Press **Retest** to test the sample again. Repeat steps 7.25 to 7.28 for a total of 3 times.

8.0 Quality control (UGMA only)

- 8.1 Accept and report the results only if the following criteria are met:
- 8.1.1 The average of the 3 weight differences in **Part 4** of form AC06.614 should not exceed ± 0.5 g.
 - 8.1.2 The range of the 3 weight differences in **Part 4** of form AC06.614 should not exceed 1.0 g.
- 8.2 If the results are outside of the tolerances (as indicated on form AC06.614 by a red “N”), verify balance calibration, clean the meter as described in the appropriate procedure and repeat the grain weight check.
- 8.3 If results are still outside the tolerances, contact your regional Industry Services analytical lab or GRL moisture lab.

9.0 Results report

- 9.1 The completed AC06.614 forms are to remain in the location’s root directory and are not to be moved into subdirectories unless directed by the moisture lab supervisor. For example:
- 9.1.1 All check test files for Calgary are to remain under the “Calgary” folder.
 - 9.1.2 All check test files for AGV in Vancouver are to remain under the “Vancouver\AGV” folders.
- 9.2 The results for the moisture checks can be found on the “ischecktest” drive in the “MOISTURE\REPORTS” folder.

10.0 Cleaning and maintenance

- 10.1 Refer to applicable standard operating procedures for cleaning and maintenance protocols.

11.0 References

- 11.1 AC04.205 Operation of Laboratory Balances
- 11.2 AC04.521 Protein and Oil Determination Using the FOSS Grain Analyzer
- 11.3 AC04.600 Model AM 5200-A Moisture Meter Operation and Maintenance

- 11.4 AC04.601 Model GAC 2500 Moisture Meter Operation and Maintenance
- 11.5 AC06.081 Balance Performance Verification
- 11.6 AC06.610 Moisture Lab – Moisture Meters Training Record
- 11.7 AC06.613 Instrument Cleaning Log
- 11.8 AC06.614 Moisture Meter Monthly Check
- 11.9 IEQ-7 Electronic Bench Scales
- 11.10 I-48 Bench Scale Monitoring