



Canadian Grain
Commission

Commission canadienne
des grains

Setup and Maintenance of FOSS Grain Analyzers

**Standard Operating Procedure
AC04.523.v2**

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1. Purpose

This document describes the setup and maintenance procedures of the FOSS grain analyzers.

2. Abbreviations

- 2.1. CPSR – Canada Prairie Spring Red
- 2.2. CWRS – Canada Western Red Spring
- 2.3. CWAD – Canada Western Amber Durum
- 2.4. CWRW – Canada Western Red Winter
- 2.5. CWHWS – Canada Western Hard White Spring
- 2.6. CWSWS – Canada Western Soft White Spring
- 2.7. GRL – Grain Research Laboratory

3. 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 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. Responsibilities

- 4.1. The GRL Protein Technician (or delegate) is responsible for training the staff and overseeing operations.
- 4.2. The GRL Protein Technician is responsible for FOSS grain analyzer setup before an analyzer is put into service.
- 4.3. All staff can do maintenance only under the direction of a GRL Protein Technician.

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- 4.4. If a FOSS grain analyzer gives an error code or acts out of the ordinary, notify the lead technician or supervisor. If the issue cannot be resolved, contact the GRL Protein Technician for support.

5. Equipment and materials

Instrumentation

- 5.1. FOSS grain analyzer

Equipment

- 5.2. Toolkit
- 5.3. Piston
- 5.4. Light bulb
- 5.5. Fuses
- 5.6. USB provided from FOSS or a Secure Key USB with application models
- 5.7. Cleaning brush
- 5.8. Canned air or equivalent
- 5.9. Surge protector
- 5.10. Mouse and keyboard

Reference Materials

- 5.11. Daily CWRS ABC Check samples
- 5.12. Daily Soybean ABC(D) Check samples
- 5.13. Calibration Sets

6. Required training

- 6.1. For laboratory staff, read and acknowledge this procedure in SoftExpert Suite (SES).
- 6.2. For non-laboratory staff, read this procedure.

7. Procedure

- 7.1. Applicable checks must be analyzed after any instrument error displays, maintenance performed, repairs completed, instrument power cycling, or intercept adjustment before resuming analysis of samples.

Setting Up 1241 Model and 9175 Model FOSS Grain Analyzers

- 7.2. Place FOSS grain analyzer on the laboratory bench or workbench.
- 7.3. Plug in keyboard.
- 7.4. Plug surge protector into an outlet. Plug power cord to into the back of the instrument and then into the surge protector.
- 7.5. Turn on analyzer; the power button is on the back of the unit.
- 7.6. The analyzer will perform startup checks. If the startup passes, the analyzer is ready to use.
- 7.7. If the startup fails, review what failed and contact the GRL Protein Technician for assistance.

Setting Up TM Model FOSS Grain Analyzers

- 7.8. Place FOSS grain analyzer on laboratory bench or workbench.
- 7.9. Plug in mouse and keyboard.
- 7.10. Plug surge protector into an outlet. Plug power cord into the back of the instrument and then into the surge protector.
- 7.11. Turn on analyzer; the power button is on the back of the unit. Let warm up for 48 hours.
- 7.12. If the initial startup fails, the instrument hardware and Performance Test does not have a green checkmark.
 - 7.12.1. Using the instrument touchscreen or mouse, press “Care” button.
 - 7.12.2. Press “Instrument Calibration”. Type in password.
 - 7.12.3. Press “Calibrate”.

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7.12.4. When complete, press “Instrument Diagnostics”. The instrument will go through the startup again. When two green checkmarks appear, the FOSS grain analyzer is ready for the next step.

7.13. Enable the Auto Calibration:

7.13.1. From the “Care” Menu, go to your “Local Configurator”.

7.13.2. Type in password.

7.13.3. On the left-hand side menu, make sure you are on “Instruments”.

7.13.4. Select at the top “Instrument Settings”.

7.13.5. Below, select “Instrument Startup”.

7.13.6. Check the box for Enabling the Auto Calibrator Startup mode.

7.13.7. Type in 15 minutes for the Auto Calibration time limit.

7.13.8. Save and exit.

7.14. Turn off Auto Start when pouring sample into hopper:

7.14.1. From the “Care Menu” go to “Local Configurator”.

7.14.2. Type in password.

7.14.3. On the left-hand side menu, select product, then select desired product (CWRS). The “Operation Profile” will be highlighted.

7.14.3.1. Barley, All Wheat Calibrations has the same “Operation Profile”.

7.14.4. Press “go to” at the bottom of the screen, press “Settings”.

7.14.5. Press ‘Sample Presentation”, then check off “Auto Start”.

7.14.6. Press “Save”.

7.14.7. Repeat for each of the “Operation Profiles” (there are four Operation Profiles on the analyzer).

7.14.8. Press ‘Save” and exit.

Adding Application Models to 1241 and 9175 Models

7.15. Insert USB containing the required application models.

7.16. Press “Menu” button on the front of the instrument.

7.17. Scroll down to select “Read disk” then press enter.

7.18. Refer to step 7.36 to adjust the intercepts.

Adding Application Models to TM Model

7.19. The keyboard and mouse are required for this section.

7.20. Plug USB with the application models into the FOSS grain analyzer.

- 7.21. Press “Care” button by using the touchscreen or using the mouse.
- 7.22. Press the “Local Configurator” button and type in password.
- 7.23. With mouse, click on Prediction models.
- 7.24. Click on file and press export.
- 7.25. One at a time, export the application models required on the instrument.
- 7.26. Once all application models are installed, click on products.
- 7.27. All wheat products/application models are based on the CWRS product/ application model. Right click on a product name “CWRS” and click on copy. Press “Save”.
- 7.28. Click on the Copied CWRS. In the “Summary” tab, change the name to the product required. Wheat product names are as follows:
- CWRS
 - Eastern Red Wheat
 - Eastern White Wheat
 - CWAD
 - CWRW
 - CPSR
 - CWHWS
 - CWSWS
- 7.29. Press “Save”.
- 7.30. Click on the “Application Model” tab. Click on the CWRS protein application model and copy. Repeat for the CWRS moisture application model. Rename the application models with the wheat product names required.
- 7.31. Repeat step 7.28 for all wheat products required.
- 7.32. Verify that the correct application models are attached to the product. Product name needs to match application model name for protein and moisture.
- 7.33. To remove an application model, make sure it is highlighted and then click on “remove”.
- 7.34. To add an application model to a Product, highlight the required one and then click on “add”. You need an application model added to each Product for protein and moisture. Press “Save”.
- 7.35. Barley, rye, oat, and soybean products will have protein, moisture, and oil application models that will be available on a USB provided by FOSS. Rye, oat, and soybean application models are licensed for each analyzer.
- 7.35.1. Click on “Operation Profiles”. Add the required intercept for each application model and press Save. Refer to step 6.53.

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7.35.2. With the mouse, press the “x” in the top right corner to be taken back to the main screen.

7.35.3. Press “results”. Pick the product you added and run the corresponding Calibration Sets to confirm intercept and that the right application model has been added to the product.

Calibration Adjustment

Note: Only make intercept adjustments with guidance from the GRL Protein Technician.

7.36. Analyze a Calibration Set to confirm the right intercept for the instrument. Record results on AC06.1353. Intercept adjustment will be made if the difference between the Calibration Set average and the analyzed average is $\geq \pm 0.2\%$ protein for the wheat application models, $\pm 0.3\%$ protein for the barley and oats application models, and $\pm 0.5\%$ protein (and oil if applicable) for the soybeans and pulses application models. The difference of the average is the required adjustment to the application model. Intercepts are adjusted by 0.050 intervals and the calibration set is re-analyzed to confirm adjustment is correct.

7.37. Follow the steps below for each specific model type.

Calibration Adjustment for 1241 and 9175 Models

7.38. Press “Menu” on the front of FOSS grain analyzer.

7.39. Press 1 on keyboard or enter on the FOSS grain analyzer for Main Menu.

7.40. Enter password.

7.41. Press 3 on keyboard - Application Model.

7.42. Press 2 on keyboard - Setup.

7.43. Press 3 on keyboard - Slope and Intercepts.

7.44. Scroll with arrow buttons on the front of the grain analyzer (down arrow) to highlight the desired Application Model.

7.45. Press Tab (double arrow left and right arrows) then Moisture will be highlighted.

7.46. Press the down arrow then Protein will be highlighted.

7.47. Press the Tab button twice. The intercept field will be highlighted.

7.48. Type in the adjustment. For example, if the current intercept is 0.100 and you want to adjust by +0.100, type in 0.200.

7.49. Press “Ok”.

7.50. Repeat for the next adjustment.

- 7.51. Press Menu on the front of the grain analyzer to get back to the result screen.
- 7.52. Analyze the Calibration Set of the application model that was adjusted to confirm the adjustment was done correctly.

Calibration Adjustment for TM Model

- 7.53. Press “Care” button; the instrument has a touchscreen or use the mouse.
- 7.54. Press “Slope and Intercept”. Enter password.
- 7.55. Scroll to the application model that requires the adjustment.
- 7.56. Press the constituent that you want to adjust and type in new intercept.
- 7.57. Press “Ok”.
- 7.58. Repeat for the next adjustment.
- 7.59. Press “Result” tab on top of screen, the instrument is ready for samples.
- 7.60. Analyze the Calibration Set of the application model that was adjusted to confirm the adjustment was done correctly.

Replacing Piston on 1241 Model

- 7.61. Two people are needed for the piston replacement.
- 7.62. Lift the hopper and have the other person hold it up while the next steps are completed.
- 7.63. At the top and bottom of the piston, pop off star washers with a thin spatula or flathead screwdriver.
- 7.64. Take off the old piston.
- 7.65. Place the new piston in the same way the old one was positioned.
- 7.66. Replace star washers back on the top and bottom of the piston.
- 7.67. Close the hopper.

Replacing Piston on 9175 Model

- 7.68. Two people are needed for the piston replacement.
- 7.69. Unplug the instrument.
- 7.70. Take off the power supply from the back of the unit. Use appropriate tools to take off the screws.
- 7.71. Lift the hopper and have the other person hold it up while the next steps are completed.
- 7.72. Use an Allen key to push the dowel through at the top and bottom of the piston.

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- 7.73. Go through the opening where the power supply was taken out and push the sides of the panel connected to the piston to help release the piston.
- 7.74. Remove the piston carefully.
- 7.75. Place the new piston in the same way the old one was positioned.
- 7.76. Push the dowel through the top and bottom of the piston to hold it into place.
- 7.77. Return the power supply back into the unit. Replace and tighten the screws.
- 7.78. Close the hopper.

Replacing Fuse on TM Model

- 7.79. Turn off the instrument and unplug from power source.
- 7.80. Use a small flathead screwdriver for the fuse located at the bottom right of the back of the instrument.
- 7.81. Loosen to remove the fuse. Place new fuse in and then tighten the screw with the flathead screwdriver.

Replacing Light Bulb on 1241 Model

- 7.82. Turn off the instrument and unplug from power source. Disconnect from mains.
- 7.83. The cover plate to the lamp assembly is located on the top of the cooling flanges on the back of the instrument (see user manual). Unscrew the two screws fastening the cover plate using the supplied 3 mm Allen key.
- 7.84. Use a flathead screwdriver to loosen the two screws holding the lamp.
- 7.85. Fit the new lamp and assemble in reverse order.
- 7.86. Once the light bulb is replaced, start up the instrument. The analyzer may need up to two hours to warm up before it is ready for use.

Replacing Light Bulb on TM Model

- 7.87. Turn off the instrument and unplug from power source. Disconnect from mains.
- 7.88. Unscrew the three screws fastening the cover plate using the supplied 3 mm Allen key.
- 7.89. Carefully turn the lamp assembly and loosen it from the instrument.
- 7.90. Use a flathead screwdriver to loosen the two screws holding the lamp cables.
- 7.91. Fit the new lamp and assemble in reverse order.
- 7.92. Once the light bulb is replaced, start up the instrument. The analyzer may need up to 48 hours to warm up before it is ready for use.

8. Documentation

- 8.1. Complete AC06.204 or record in SES when performing maintenance on the FOSS grain analyzer, including work done by third-party service technicians.
- 8.2. For laboratory staff only: If any instrumentation involved in this method breaks down or fails, mark it with an AC06.382 Do Not Use Sign, report the issue to a supervisor and Quality staff, and initiate a Quality System Occurrence (QSO) report following AC04.127 if needed.

9. References

- 9.1. FOSS grain analyzer user manuals
- 9.2. AC04.127 Quality System Occurrence
- 9.3. AC04.521 Protein and Oil Determination using the FOSS Grain Analyzer
- 9.4. AC06.204 Equipment Maintenance Record
- 9.5. AC06.382 Do Not Use Sign
- 9.6. AC06.1353 Calibration and Adjustment for Protein