

# Directive

9180.61

May 1, 2023

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## OFFICIAL MOISTURE CALIBRATIONS FOR UNIFIED GRAIN MOISTURE ALGORITHM (UGMA) COMPATIBLE METERS

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## 1. PURPOSE

This directive defines the official calibrations for use with the DICKEY-john GAC 2500-UGMA, DICKEY-john GAC 2700-UGMA, PerkinElmer AM 5200-A, and FOSS GAC 2500-C moisture meters used by the Agricultural Marketing Service (AMS) and its system of Official Inspection Providers for official grain moisture measurement.

## 2. BACKGROUND

This directive specifies updated official UGMA-compatible moisture meter calibrations for Oats (DICKEY-john/FOSS), Triticale (All Models), and Rye (All Models) through which moisture results will be changed.

To maintain compatibility with state regulatory programs for moisture meters certified for test weight measurements, test weight coefficients were updated for Oats (DICKEY-john/FOSS), Triticale (DICKEY-john/FOSS), and Rye (DICKEY-john/FOSS). Test weight coefficients are combined with moisture coefficients into a single calibration file and the changes for these grains are for test weight only and will not affect moisture results unless otherwise noted above.

This directive specifies the update of the temperature parameters on Soybeans. Changes in moisture are only anticipated in extreme temperature samples.

This directive also restates all other calibrations transmitted in the previous directive dated August 1, 2022.

AMS requires that its official moisture instruments conform to National Type Evaluation Program requirements so they can be used for commercial as well as official grain inspection. The NTEP requirements are stated in the National Conference on Weights and Measures: Publication 14 Grain Moisture Meters & Near Infrared Grain Analyzers ©2023.

AMS's calibration accuracy criteria, more restrictive than the NTEP requirements, mandates that the average difference between the results from a meter model and the USDA air oven method must not exceed +/- 0.15 percent moisture (for the most recent three years of data for the NTEP grains and for five years of data for the minor grains). The tolerance is increased slightly if the number of available samples is small. Tolerances for agreement between UGMA-Compatible meter models and AMS's master UGMA system are defined in CRITERIA FOR UNIFIED GRAIN MOISTURE ALGORITHM (UGMA) AND OFFICIAL SYSTEM COMPATIBILITY (available on the AMS website).

Attachment 1 lists the DICKEY-john GAC 2500-UGMA (FOSS GAC 2500-C), DICKEY-john GAC 2700-UGMA, and PerkinElmer AM 5200-A calibration versions for the major grains (those grains that are also included in the NTEP) and for non-NTEP minor grains and commodities for official grain moisture measurements. The FOSS GAC 2500-C and DICKEY-john GAC 2700-UGMA uses the same calibrations as the DICKEY-john GAC 2500-UGMA. Attachment 2 lists calibration moisture ranges and temperature ranges applicable to both meter models. The basic sample temperature range across all moisture contents and all grains is 0 to 45 °C (32 to 113 °F). The lower temperature limit is extended to -18 °C (-0.4 °F) for moisture levels below the limits indicated for each grain type in Attachment 2. Moisture readings are automatically inhibited when sample temperatures are outside the specified ranges.

Additional calibration updates will be issued on August 1, 2023, for Long Grain Milled Rice (All Models), and Medium Grain Milled Rice (All Models), for which moisture results will be changed.

To maintain compatibility with state regulatory programs for moisture meters certified for test weight measurements, test weight coefficients were updated for Long Grain Rough Rice (All Models) and Sorghum (DICKEY-John/FOSS). Test weight coefficients are combined with moisture coefficients into a single calibration file and the changes for these grains are for test weight only and will not affect moisture results unless otherwise noted above.

### **3. REPLACEMENT HIGHLIGHTS**

This directive replaces Directive 9180.61, Official Moisture Meter Calibrations, dated, August 1, 2022.

### **4. PROCEDURES**

Official calibration files and installation instructions for both the DICKEY-john GAC 2500- UGMA and the PerkinElmer AM 5200-A are available for download at Moisture Equipment (<https://www.ams.usda.gov/services/fgis/standardization/moisture-equipment>). Official calibrations and updates to calibrations must be installed on the FOSS GAC 2500-C remotely through the FossManager network software. Please contact FOSS at (952) 974-9892 ext. 3 to request the latest calibration be updated to your GAC 2500-C. All official inspection laboratories shall use these official calibrations for the DICKEY-john GAC 2500-UGMA, DICKEY-john GAC 2700-UGMA, PerkinElmer AM 5200-A, and FOSS GAC 2500-C meters for all grains and commodities for official inspections performed on and after May 1, 2023.

### **5. QUESTIONS**

Direct any questions concerning this directive to the Inspection Instrumentation Branch at (816) 702-3800.

Attachments

**Attachment 1: Grain types as displayed on the moisture meters with current calibration version identifiers.**

| <b>Grain/Commodity Name</b> | <b>Displayed Grain Type</b> | <b>PerkinElmer AM 5200-A Calibration Version</b> | <b>DICKEY-john GAC 2500-UGMA Calibration Version</b> | <b>Calibration Effective Date*</b>   |
|-----------------------------|-----------------------------|--|--|--------------------------------------|
| <b>NTEP GRAINS</b>          |                             |  |  |                                      |
| Barley, Six-rowed           | Barley 6Row                 | BAR 200417                                       | 20200415N  | May 1, 2020                          |
| Barley, Two-rowed           | Barley 2Row                 | BAR 200417                                       | 20200415N  | May 1, 2020                          |
| Corn                        | Corn                        | CORN 210414                                      | 20200415N  | Aug. 1, 2020 (D)<br>Aug. 1, 2021 (P) |
| Oats                        | Oats                        | OATS 190415                                      | 20230412N  | May 1, 2023 (D)<br>May 1, 2019 (P)   |
| Rice, Long Grain Rough      | Rice LG Ruf                 | LGRR 220415                                      | 20220413N  | Aug. 1, 2022                         |
| Rice, Medium Grain Rough    | Rice MG Ruf                 | MGRR 220415                                      | 20220413N  | Aug. 1, 2022                         |
| Sorghum                     | Sorghum                     | SORG 200417                                      | 20200415N  | Aug. 1, 2020                         |
| Soybeans                    | Soybeans                    | SOY 220415                                       | 20220413N  | Aug. 1, 2022                         |
| Sunflower seed (Oil-Type)   | Sunflower                   | SFS 220415                                       | 20220413N  | Aug. 1, 2022                         |
| Wheat, Durum                | Durum                       | DURUM 180417                                     | 20170417N  | May 1, 2019 (D)<br>May 1, 2018 (P)   |
| Wheat, Hard Red Spring      | Wheat HRS                   | WHTH 190415                                      | 20200415N  | May 1, 2020 (D)<br>May 1, 2019 (P)   |
| Wheat, Hard Red Winter      | Wheat HRW                   | WHTH 190415                                      | 20200415N  | May 1, 2020 (D)<br>May 1, 2019 (P)   |
| Wheat, Hard White           | Wheat HW                    | WHTH 190415                                      | 20200415N  | May 1, 2020 (D)<br>May 1, 2019 (P)   |
| Wheat, Soft Red Winter      | Wheat SRW                   | WHTS 200417                                      | 20200415N  | May 1, 2020                          |
| Wheat, Soft White           | Wheat SW                    | WHTS 200417                                      | 20200415N  | May 1, 2020                          |
| <b>NON-NTEP GRAINS</b>      |                             |  |  |                                      |
| Beans, Baby Lima            | BN Baby Lima                | BEAN2 210414                                     | 20210414   | Aug. 1, 2021                         |
| Beans, Black                | BN Black                    | BEAN3 200417                                     | 20130501   | May 1, 2013 (D)<br>Aug. 1, 2020 (P)  |
| Beans, Blackeye             | BN Blackeye                 | BEAN1 200417                                     | 20130501   | May 1, 2013 (D)<br>Aug. 1, 2020 (P)  |
| Beans, Cranberry            | BN Cranberry                | BEAN1 200417                                     | 20130501   | May 1, 2013 (D)<br>Aug. 1, 2020 (P)  |
| Beans, Kidney               | BN Kidney                   | BEAN5 200417                                     | 20180414   | Aug. 1, 2018 (D)<br>Aug. 1, 2020 (P) |
| Beans, Garbanzo             | BN Garbanzo                 | BEAN2 210414                                     | 20210414   | Aug. 1, 2021                         |

**\*Note: Calibration effective dates with a (D) apply to the Dickey-john GAC 2500-UGMA, Dickey-john GAC 2700-UGMA, and FOSS GAC 2500-C. Dates with a (P) apply to the PerkinElmer AM 5200-A, and dates without a ( ) apply to all models.**

| Grain/Commodity Name             | Displayed Grain Type | PerkinElmer AM 5200-A Calibration Version | DICKEY-john GAC 2500-UGMA Calibration Version | Calibration Effective Date*          |
|----------------------------------|----------------------|---|---|--------------------------------------|
| Beans, Great Northern            | BN Grt Nrthn         | BEAN3 200417                              | 20220413                                      | Aug. 1, 2022 (D)<br>Aug. 1, 2020(P)  |
| Beans, Large Lima                | BN Lrg Lima          | BEAN3 200417                              | 20130501                                      | May 1, 2013 (D)<br>Aug. 1, 2020 (P)  |
| Beans, Pea                       | BN Pea               | BEAN4 200417                              | 20130501                                      | May 1, 2013 (D)<br>Aug. 1, 2020 (P)  |
| Beans, Pink                      | BN Pink              | BEAN1 200417                              | 20130501                                      | May 1, 2013 (D)<br>Aug. 1, 2020 (P)  |
| Beans, Pinto                     | BN Pinto             | BEAN1 200417                              | 20170417                                      | Aug. 1, 2017 (D)<br>Aug. 1, 2020 (P) |
| Beans, Small Red                 | BN Small Red         | BEAN2 210414                              | 20210414                                      | Aug. 1, 2021                         |
| Beans, Small White               | BN Small Wht         | BEAN4 200417                              | 20130501                                      | May 1, 2013 (D)<br>Aug. 1, 2020 (P)  |
| Beans, Yelloweye                 | BN Yelloweye         | BEAN2 210414                              | 20210414                                      | Aug. 1, 2021                         |
| Canola                           | Canola               | CANOLA 190415                             | 20190415                                      | Aug. 1, 2019                         |
| Flaxseed                         | Flaxseed             | FLAX 140418                               | 20130501                                      | May 1, 2013 (D)<br>Aug. 1, 2014 (P)  |
| Lentils                          | Lentils              | BEAN5 200417                              | 20180414                                      | Aug. 1, 2018 (D)<br>Aug. 1, 2020 (P) |
| Mustard seed, Brown              | Mustard Brn          | MUSTARD 130415                            | 20130501                                      | May 1, 2013                          |
| Mustard seed, Oriental           | Mustard O            | OMUSTARD 130415                           | 20130501                                      | May 1, 2013                          |
| Mustard seed, Yellow             | Mustard Y            | MUSTARD 130415                            | 20130501                                      | May 1, 2013                          |
| Peas, Mottled                    | Peas Mottled         | PEAS 220415                               | 20200415                                      | Aug. 1, 2020 (D)<br>Aug. 1, 2022 (P) |
| Peas, Smooth Dry                 | Peas Smooth          | PEAS 220415                               | 20200415                                      | Aug. 1, 2020 (D)<br>Aug. 1, 2022 (P) |
| Peas, Split                      | Peas Split           | BEAN1 200417                              | 20130501                                      | May 1, 2013 (D)<br>Aug. 1, 2020 (P)  |
| Peas, Wrinkled Dry               | Peas Wrinkl'd        | PEAS 220415                               | 20200415                                      | Aug. 1, 2020 (P)<br>Aug. 1, 2022 (P) |
| Popcorn                          | Popcorn              | POPCORN 150420                            | 20150420                                      | Aug. 1, 2015                         |
| Rapeseed                         | Rapeseed             | CANOLA 190415                             | 20190415                                      | Aug. 1, 2019                         |
| Rice, Brewers Milled             | Rice BMR             | SMRICE 140418                             | 20140418                                      | Aug. 1, 2014                         |
| Rice, Brewers Milled Parboiled   | Rice BMRP            | PBRICE 210414                             | 20220413                                      | Aug. 1, 2022 (D)<br>Aug. 1, 2021 (P) |
| Rice, Long Grain Brown           | Rice LGBR            | BRRICE 140418                             | 20140418                                      | Aug. 1, 2014                         |
| Rice, Long Grain Brown Parboiled | Rice LGBRP           | PBRICE 210414                             | 20220413                                      | Aug. 1, 2022 (D)<br>Aug. 1, 2021(P)  |

**\*Note: Calibration effective dates with a (D) apply to the DICKY-john GAC 2500-UGMA, DICKY-john GAC 2700-UGMA, and FOSS GAC 2500-C. Dates with a (P) apply to the PerkinElmer AM 5200-A, and dates without a ( ) apply to all models.**



| <b>Grain/Commodity Name</b>         | <b>Displayed Grain Type</b> | <b>PerkinElmer AM 5200-A Calibration Version</b> | <b>DICKEY-john GAC 2500-UGMA Calibration Version</b> | <b>Calibration Effective Date*</b>   |
|-------------------------------------|-----------------------------|--|--|--------------------------------------|
| Rice, Long Grain Milled             | Rice LGMR                   | LMRICE 210414                                    | 20210414   | Aug. 1, 2021                         |
| Rice, Long Grain Milled Parboiled   | Rice LGMRP                  | PBRICE 210414                                    | 20220413   | Aug. 1, 2022 (D)<br>Aug. 1, 2021 (P) |
| Rice, Medium Grain Brown            | Rice MGBR                   | BRRICE 140418                                    | 20140418   | Aug. 1, 2014                         |
| Rice, Medium Grain Milled           | Rice MGMR                   | LMRICE 210414                                    | 20210414   | Aug. 1, 2021                         |
| Rice, Medium Grain Milled Parboiled | Rice MGMRP                  | PBRICE 210414                                    | 20220413   | Aug. 1, 2022 (D)<br>Aug. 1, 2021 (P) |
| Rice, Screenings Milled             | Rice SMR                    | SMRICE 140418                                    | 20140418   | Aug. 1, 2014                         |
| Rice, Second Head Milled            | Rice SHMR                   | SMRICE 140418                                    | 20140418   | Aug. 1, 2014                         |
| Rice, Second Head Milled Parboiled  | Rice SHMRP                  | PBRICE 210414                                    | 20220413   | Aug. 1, 2022 (D)<br>Aug. 1, 2021 (P) |
| Rice, Short Grain Brown             | Rice SGBR                   | BRRICE 140418                                    | 20140418   | Aug. 1, 2014                         |
| Rice, Short Grain Milled            | Rice SGMR                   | SMRICE 140418                                    | 20140418   | Aug. 1, 2014                         |
| Rice, Short Grain Rough             | Rice SG Ruf                 | SGRR 190415                                      | 20190415   | Aug. 1, 2019                         |
| Rye                                 | Rye                         | RYE 230415                                       | 20230412   | May 1, 2023                          |
| Safflower seed                      | Safflower                   | SAFFL 140418                                     | 20130501   | May 1, 2013 (D)<br>Aug. 1, 2014 (P)  |
| Sunflower seed (Confectionary)      | Sunflwr Conf                | SFS 220415                                       | 20220413   | Aug. 1, 2022                         |
| Triticale                           | Triticale                   | RYE 230415                                       | 20230412   | May 1, 2023                          |
| <b>NON-STANDARDIZED GRAINS</b>      |                             |  |  |                                      |
| Barley, Hulless                     | Barley Hless                | BAR 200417                                       | 20200415   | May 1, 2020                          |
| Buckwheat                           | Buckwheat                   | BKWHT 140418                                     | 20140418   | Aug. 1, 2014                         |
| Buckwheat Groats                    | Buckwheat Gr                | BKWHT 140418                                     | 20140418   | Aug. 1, 2014                         |
| Oats, Hulless                       | Oats Hless                  | DURUM 150420                                     | 20150420   | May 1, 2015                          |

**\*Note: Calibration effective dates with a (D) apply to the DICKY-john GAC 2500-UGMA, DICKY-john GAC 2700-UGMA, and FOSS GAC 2500-C. Dates with a (P) apply to the PerkinElmer AM 5200-A, and dates without a ( ) apply to all models.**

## Attachment 2: Official Calibration Moisture and Temperature Ranges

Official calibration moisture ranges (outside of which warnings are displayed) and upper moisture limits for moisture measurements when sample temperatures are below 0 °C (32 °F). The upper sample temperature limit is 45 °C (113 °F) for all grain types.

| Grain/Commodity Name      | Calibration Moisture Range (%) | Temperature limit extended to -18°C (0 °F) for moisture less than __% |
|---------------------------|--------------------------------|---|
| <b>NTEP GRAINS</b>        |                                |   |
| Barley, Six-rowed         | 8-18                           | 18  |
| Barley, Two-rowed         | 8-18                           | 18  |
| Corn                      | 6-46                           | 19  |
| Oats                      | 8-16                           | 13  |
| Rice, Long Grain Rough    | 8-26                           | 18  |
| Rice, Medium Grain Rough  | 8-28                           | 18  |
| Sorghum                   | 10-24                          | 16  |
| Soybeans                  | 5-24                           | 20  |
| Sunflower seed (Oil-Type) | 4-28                           | 13  |
| Wheat, Durum              | 4-30                           | 19  |
| Wheat, Hard Red Spring    | 6-22                           | 19  |
| Wheat, Hard Red Winter    | 6-22                           | 19  |
| Wheat, Hard White         | 6-22                           | 19  |
| Wheat, Soft Red Winter    | 7-24                           | 19  |
| Wheat, Soft White         | 7-24                           | 19  |
| <b>NON-NTEP GRAINS</b>    |                                |   |
| Beans, Baby Lima          | 6-20                           | 15  |
| Beans, Black              | 8-20                           | 15  |
| Beans, Blackeye           | 8-20                           | 15  |
| Beans, Cranberry          | 8-20                           | 15  |
| Beans, Kidney             | 6-20                           | 15  |
| Beans, Garbanzo           | 6-20                           | 15  |
| Beans, Great Northern     | 8-20                           | 15  |
| Beans, Large Lima         | 8-20                           | 15  |
| Beans, Pea                | 8-22                           | 15  |
| Beans, Pink               | 8-20                           | 15  |
| Beans, Pinto              | 8-20                           | 15  |
| Beans, Small Red          | 6-20                           | 15  |
| Beans, Small White        | 8-22                           | 15  |
| Beans, Yelloweye          | 6-20                           | 15  |

| <b>Grain/Commodity Name</b>         | <b>Calibration Moisture Range (%)</b> | <b>Temperature limit extended to -18°C (0 °F) for moisture less than __%</b> |
|-------------------------------------|---------------------------------------|--|
| Canola                              | 4-14                                  | 18   |
| Flaxseed                            | 6-14                                  | 10   |
| Lentils                             | 6-20                                  | 15   |
| Mustard Seed, Brown                 | 6-12                                  | 9  |
| Mustard Seed, Oriental              | 6-18                                  | 9  |
| Mustard Seed, Yellow                | 6-12                                  | 9  |
| Peas, Mottled                       | 6-16                                  | 15   |
| Peas, Smooth Dry                    | 6-16                                  | 15   |
| Peas, Split                         | 8-20                                  | 15   |
| Peas, Wrinkled Dry                  | 6-16                                  | 15   |
| Popcorn                             | 10-30                                 | 19   |
| Rapeseed                            | 4-14                                  | 18   |
| Rice, Brewers Milled                | 10-16                                 | 16   |
| Rice, Brewers Milled Parboiled      | 10-14                                 | 13   |
| Rice, Long Grain Brown              | 10-22                                 | 16   |
| Rice, Long Grain Brown Parboiled    | 10-14                                 | 13   |
| Rice, Long Grain Milled             | 10-18                                 | 16   |
| Rice, Long Grain Milled Parboiled   | 10-14                                 | 13   |
| Rice, Medium Grain Brown            | 10-22                                 | 16   |
| Rice, Medium Grain Milled           | 10-18                                 | 16   |
| Rice, Medium Grain Milled Parboiled | 10-14                                 | 13   |
| Rice, Screenings Milled             | 10-16                                 | 16   |
| Rice, Second Head Milled            | 10-16                                 | 16   |
| Rice, Second Head Milled Parboiled  | 10-14                                 | 13   |
| Rice, Short Grain Brown             | 10-22                                 | 16   |
| Rice, Short Grain Milled            | 10-16                                 | 16   |
| Rice, Short Grain Rough             | 10-28                                 | 18   |
| Rye                                 | 8-16                                  | 16   |
| Safflower seed                      | 4-14                                  | 12   |
| Sunflower seed (Confectionary)      | 4-28                                  | 13   |
| Triticale                           | 8-16                                  | 16   |
| <b>NON-STANDARDIZED GRAINS</b>      |                                       |  |
| Barley, Hulless                     | 8-18                                  | 18   |
| Buckwheat                           | 10-19                                 | 13   |
| Buckwheat Groats                    | 10-19                                 | 13   |
| Oats, Hulless                       | 4-30                                  | 19   |