

Council on Dairy Cattle Breeding

Auditing Procedures for Meter Centers and Technicians

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The purpose of this manual is to ensure the accuracy and uniformity of all records included in the national *Genetic Evaluation Program*.

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Meter Center Audits and Certification

Meter Center Setup and Conditional Certification

To ensure that meter center equipment is properly installed and configured, the auditor may authorize qualified persons to assist in the design and construction of meter centers and allow them to issue a conditional certification. If applicable, a list of those persons will be available from the auditor.

Initial Certification Audits

Before achieving initial certification, meter centers must submit to an on-site audit and demonstrate compliance with all aspects of this manual, the *General Auditing Guidelines*, and with the National DHIA *Uniform Operating Procedures - Code of Ethics* and *Uniform Data Collection Procedures*.

Meter Center Audits

Once certification has been established, meter centers will be subject to a biennial, on-site audit in order to renew their certification. Meter center audits are test procedure specific and each procedure must be adequately demonstrated during the on-site audit. **At any time, additional audits may be called at auditor's discretion, or may be requested by the cooperating organization.**

Scheduling of Audits

Each meter center will be assigned a centering period month for on-site audits. Audits must be performed within 60 days of the centering period month.

Portable Meter Centers

In cases where service providers have a stationary meter center for meter repair and calibration checks, but also use a portable meter center for calibration checks, the portable meter center is also subject to separate, but concurrent on-site audit.

Period of Certification

The certification period will begin on the day of the on-site audit and extend through the last day of the 26th month following the centering period month. Meter centers failing to achieve certification renewal by the end of the 26th month will be classified as decertified.

If failure to maintain standards is determined to have occurred by the auditor during the certification period, the service provider can be decertified prior to the end of the current certification period.

Decertification Procedures

Decertification will only be considered when the performance of a meter center has fallen below the minimum standards and the organization does not take prompt action to return to compliance within the time period specified by the auditor.

Decertification Appeals

For policies and procedures on decertification appeals, please refer to the *General Auditing Guidelines* for a detailed protocol.

Meter Technician Audits and Certification

Meter Technician Training and Conditional Certification

To ensure that meter technicians are properly trained in the repair and calibration check techniques of portable meters, the auditor may authorize qualified persons as meter technician trainers and allow them to issue a conditional certification. If applicable, a list of those persons will be available from the auditor.

Initial Certification Audits

Before achieving initial certification, meter technicians must submit to an on-site audit and demonstrate compliance with all aspects of this manual, the *General Auditing Guidelines*, and with the National DHIA *Uniform Operating Procedures - Code of Ethics* and *Uniform Data Collection Procedures*.

Continuing Education of Meter Technicians

Each meter technician is required to attend a Meter Technician Training School approved by the auditor at least once every five years to retain certification.

Calibration Check Demonstrations

During an on-site audit, each meter technician will be expected to demonstrate proficiency with the meter calibration method(s) they use. The correct procedures are described within this manual.

Meter Model Certification

Certification for meter technicians will be meter model specific. When new meter models are introduced, it will be the responsibility of the meter technician to receive appropriate training for that model prior to checking the new model for calibration and to demonstrate proficiency during a meter technician audit.

Period of Certification

The certification period will begin on the day of the on-site audit and extend for 26 months. Meter technicians failing to achieve certification renewal by the end of the 26th month will be classified as decertified.

If failure to maintain standards is determined to have occurred by the auditor during the certification period, the service provider can be decertified prior to the end of the current certification period.

Decertification Procedures

Decertification will only be considered when the performance of a meter technician has fallen below the minimum standards and the technician does not take prompt action to return to compliance within the time period specified by the auditor.

Decertification Appeals

For policies and procedures on decertification appeals, please refer to the *General Auditing Guidelines* for a detailed protocol.

Centering Period Months for Meter Centers – Even Years

Meter Centers are subject to mandatory biennial, on-site audits. Below is a schedule of target months for the on-site audits scheduled to occur during even numbered years.

January	
February	Kings County DHIA Fresno DHIA
March	Texas DHIA – Stephenville Integrated Milk Testing Services
April	
May	
June	
July	Mini-Cassia Calibration Center Vanden Bosch Calibration Center Rocky Mountain DHIA
August	Southern Counties DHIA Tulare DHIA
September	Dairy One Cooperative Inc. – Portable Dairy One Cooperative Inc. – Stationary
October	
November	Heart of America DHIA - Portable DHI Cooperative – Missouri Portable Washington State DHIA Willamette DHIA
December	

Centering Period Months for Meter Centers – Odd Years

Meter Centers are subject to mandatory biennial, on-site audits. Below is a schedule of target months for the on-site audits scheduled to occur during odd numbered years.

January	Minnesota DHIA
February	Arizona DHIA
.....	The Udder Tester, LLC
March	
April	DHI Cooperative Inc. – Ohio Portable
May	Eastern New Mexico DHIA – Roswell
.....	Eastern New Mexico DHIA – Clovis
.....	Texas DHIA – Canyon
.....	Circle H Headquarters, LLC
.....	Central Counties DHIA
June	CentralStar Cooperative Inc. – Michigan
July.....	
August.....	Lancaster DHIA
September	
October.....	AgSource Dairy – Portable - Dorchester
.....	AgSource Dairy – Portable - Menomonie
.....	AgSource Dairy – Mega Test Rig and Calibration Rig - Menomonie
November.....	CentralStar Cooperative Inc. – Wisconsin
December	United Federation of DHIAs – Portable

Auditing of Calibration Check Equipment

Equipment Responsibility

The meter center is responsible for acquiring and maintaining all equipment and parts necessary for the proper calibration and repair of all types of weighing and sampling devices being serviced.

Equipment Required for Water Testing Methods

In order to operate any of the water test methods, the meter center must have the following equipment:

- A manual from the manufacturer for each type of meter being checked for calibration,
- A volumetric flask or scale accurate to within 1%,
- A forty-pound capacity bucket or pail,
- A stable vacuum source capable of providing 15 in. Hg or 50 kPa,
- A vacuum trap such as a weigh jar or bucket milker with a vacuum shut-off valve,
- Two or three vacuum hoses, and
- A level and secure meter mounting bracket.
- All calibrations, regardless of test method used, must be performed using a manufacturer's approved calibration wand or a closed (jar-to-jar) system approved by the auditor.

Equipment Required for the Standard Water Test Method

In addition to the general equipment listed above, the meter center must have either a manufacturer's calibration wand or a meter inlet hose equipped with a restrictor orifice sized to produce a water flow of 8 pounds per minute and an air admission orifice admitting ½-cubic foot per minute (CFM) of air measured at atmospheric pressure. The air admission orifice is to be fitted 24-36 inches from the meter inlet. The correct airflow can usually be provided by a hole produced by a #60 drill or by a 16-gauge hypodermic needle inserted into the inlet hose.

Equipment Required for the Dual-Meter Test Method

In addition to the general equipment listed above and the equipment required for the standard water test method, the meter center must have an additional level and secure mounting bracket and an additional hose between 24 and 36 inches in length.

Equipment Required for the Fast-Flow Water Test Method

In addition to the general equipment listed above, the meter center must have a fast-flow rig capable of holding forty pounds of water and equipped with a manufacturer's calibration wand having an orifice sized to produce the proper flow rate per minute.

Equipment Required for the Weight Test Method for Scales

In order to check the calibration of scales, the meter center must have access to a set of weights accurate to within 1% in the following increments:

- If the weights are measured in pounds, they must be capable of determining increments of 10, 20, 30, 40, and 50 pounds for dairy cows and increments of 1, 2, 5, 10, and 20 pounds for dairy goats and dairy sheep.
- If the weights are measured in kilograms, they must be capable of determining increments of 5, 10, 15, 20, and 25 kilograms for dairy cows and increments of 0.5, 1, 2.5, 5 and 10 kilograms for dairy goats and dairy sheep.

Auditing of Calibration Check Documentation

Calibration Check Documentation

The meter technician must provide complete documentation to the meter owner for each portable meter or scale checked for calibration. This documentation may be in the form of a computerized spreadsheet, manual listing, or other organized system and must include a report summarizing the number of meters checked and:

- The make, model, and unique identification number of the meter or scale,
- The owner of the meter or scale,
- The meter technician's name or initials,
- The date of calibration check(s),
- The preliminary calibration check reading, and
- The actual calibration check readings.

Calibration Check Readings

The meter technician must record the actual calibration check readings in the reported documentation. The readings must correspond to the flask or scale gradations or the digital display of the meter or scale.

Acceptable Readings and Minimum Number of Calibration Checks Required for Portable Meters

For all eligible meters for dairy cows, the following guidelines should be used for determining the relative accuracy and number of calibration checks required to meet the auditing specifications:

- Meter readings between 35.7 and 37.1 pounds are within the 2% tolerance range and are considered accurate. No additional calibration checks are required to meet the auditing guidelines.
- Meter readings between 35.3 – 35.6 pounds OR 37.2 – 37.5 pounds are within the 2-3% tolerance range. A second calibration check is required to confirm their accuracy and meet the auditing guidelines.
- Meter readings <35.3 pounds or >37.5 pounds are outside the 3% tolerance and are not considered accurate enough for collecting milk weights. Portable meters must be repaired and checked for calibration again or taken out of service if they cannot consistently read within the 3% tolerance range.

Acceptable Readings for Calibration Checks of Scales

A chart illustrating acceptable readings for calibration checks of scales is available from the auditor. All readings should fall within 3% of the known weight.

Calibration Check Tags or Markings

The meter technician must mark each portable meter or scale with a tag, sticker, band, engraving, or other identifier, indicating the calibration year and the meter center performing the calibration check prior to returning the meter or scale to the owner.

Calibration of Repaired Meters and Scales

The meter technician must check the calibration of all portable meters and scales receiving repairs that may have affected accuracy before returning them to active service. The meter technician must check the calibration of all new portable meters and scales with manufacturing dates older than 365 days from the date placed in service.

Auditing of the Water Test Procedures for Portable Meters

Eligible Portable Meters

The meter technician must demonstrate knowledge of each of the meter models eligible for each water test procedures. A list of meter models eligible for the standard flow, dual-meter and fast-flow water test procedures is available from the auditor.

Vacuum System and Equipment Configuration

The meter technician must demonstrate a working knowledge of the meter center setup and standard flow water test method equipment.

All calibrations must be performed using a manufacturer's approved wand or a closed (jar-to-jar) system approved by the auditor. Design specifications and flow schematics for each water test procedure are available from the auditor.

Initial Water Measurement

The meter technician must demonstrate that the initial water measurement has been attained through the use of a volumetric flask or digital scale capable of calibration to 1%. Weigh jars and float pails are not considered accurate enough to determine initial water measurement.

On-going Water Measurement

The meter technician must demonstrate an approved method of maintaining the water volume throughout a series of meter calibration checks. Approved methods include the use of a working float pail or a digital scale capable of calibration to 1%.

Flow Rates

The meter technician must demonstrate an understanding of the flow rates required for each water test procedure.

Acceptable Results

The meter technician must demonstrate an understanding of the acceptable calibration check results.

Auditing of the Weight Test Procedure for Scales

Weight Check Range

The meter technician must demonstrate an understanding of the range of weights required for scale calibration checks.

Scale Operation

The meter technician must demonstrate a working knowledge of the scale operation and adjustment procedures.

Acceptable Results

The meter technician must demonstrate an understanding of the acceptable calibration check results.

Description of the Standard Water Test Method for Portable Meters

Calibration Check Procedure

In order to properly conduct a calibration check using the Standard Water Test Method, the following procedure must be performed:

1. Using a volumetric flask or accurate scale, exactly 16.0 liters, 16.0 kg, 4.23 gallons, or 35.3 pounds of water should be placed in the forty-pound capacity pail.
2. The portable meter to be tested should be placed in the leveled bracket.
3. The suction hose containing the restrictor and air admission orifices should be connected to the portable meter inlet with the air admission orifice at least 24 inches from the portable meter inlet. The other end of the suction hose should be placed in the forty-pound capacity pail.
4. The hose from the vacuum source should be connected to the vacuum trap and the hose from the vacuum trap should be connected to the portable meter outlet.
5. The vacuum source should be turned on and must provide 15 in. Hg of vacuum.
6. The vacuum trap valve should be opened and the water should be drawn into the portable meter inlet at a rate of 8-pounds per minute and air should be drawn into the air admission orifice at the rate of ½-CFM.
7. The water and air mixture should pass through the portable meter and the water should be captured in the vacuum trap.
8. The lower meniscus water level should be read on the portable meter and recorded as the calibration check reading.
9. The water remaining in the portable meter should be released into the vacuum trap and the vacuum trap valve should be turned off.
10. The water should be transferred from the vacuum trap into the forty-pound capacity pail and the steps 6-10 should be repeated as necessary.

Description of the Fast-Flow Water Test Method for Portable Meters

Calibration Check Procedure

In order to properly conduct a calibration check using the Fast-Flow Water Test Method, the following procedure must be performed:

1. Using a volumetric flask or accurate scale, exactly 16.0 liters, 16.0 kg, 4.23 gallons, or 35.3 pounds of water should be placed in the fast-flow rig and the setting on the float indicator should be checked.
2. The portable meter to be tested should be placed in the leveled bracket. For Tru-Test meters, the flask to body seal ring should be 63 inches from the bottom opening of the water inlet tube.
3. A vacuum hose should be connected between the water inlet tube on the fast-flow rig and the portable meter inlet. This connection should be relatively straight.
4. The hose from the vacuum source should be connected to the vacuum trap and the hose from the vacuum trap should be connected to the portable meter outlet.
5. The vacuum source should be turned on and should provide 15 in. Hg of vacuum.
6. The valve on the water inlet tube of the fast-flow rig should be opened and the water should be drawn into the portable meter inlet. There should be no air inlet source.
7. For standard bore Tru-Test meters, the fast-flow rig should empty in 68 seconds.
8. For wide bore Tru-Test meters, the fast-flow rig should empty in 65 seconds.
9. The water should pass through the portable meter and should be captured in the vacuum trap.
10. The valve on the water inlet tube of the fast-flow rig should be closed.
11. The lower meniscus water level should be read on the portable meter and recorded as the calibration check reading.
12. The water remaining in the portable meter should be released into the vacuum trap.
13. The water should be transferred from the vacuum trap into the fast-flow rig and the steps 6-11 should be repeated as necessary.

Description of the Dual-Meter Water Test Method for Portable Meters

Calibration Check Procedure

In order to properly conduct a calibration check using the Dual-Meter Water Test Method, the following procedure must be performed:

1. Using a volumetric flask or accurate scale, exactly 16.0 liters, 16.0 kg, 4.23 gallons, or 35.3 pounds of water should be placed in the forty-pound capacity pail.
2. The two portable meters to be tested should be placed in the leveled brackets. For this procedure, they will be referred to as meters X and Y.
3. The suction hose containing the restrictor and air admission orifices should be connected to the inlet of portable meter X with the air admission orifice approximately 24 inches from the portable meter inlet.
4. The other end of the suction hose should be placed in the forty-pound capacity pail.
5. A hose should be connected from the outlet of portable meter X to the inlet of portable meter Y.
6. The hose from the vacuum source should be connected to the vacuum trap.
7. The hose from the vacuum trap should be connected to the outlet of portable meter Y.
8. The vacuum source should be turned on and should provide 15 in. Hg of vacuum.
9. The vacuum trap valve should be opened and the water should be drawn into the inlet of portable meter X at a rate of 8-pounds per minute and air should be drawn into the air admission orifice at the rate of $\frac{1}{2}$ -CFM.
10. The water and air mixture should pass through portable meter X and continue through portable meter Y.
11. After passing through portable meter Y, the water should be captured in the vacuum trap. The lower meniscus water level should be read on portable meter X and recorded as the calibration check reading.
12. The water remaining in portable meter X should be released into portable meter Y, including any water captured in the sampler. The lower meniscus water level should be read on portable meter Y and recorded as the preliminary calibration check reading.
13. The water remaining in portable meter Y should be released into the vacuum trap and the vacuum trap valve should be turned off.
14. The water should be transferred from the vacuum trap into the forty-pound capacity pail and the steps 9-16 should be repeated as necessary.

Description of the Weight Test Method for Scales

Calibration Check Procedure

In order to properly conduct a calibration check using the Weight Test Method, the following procedure must be performed:

1. With the hanging scale hooked on a secure structure, a bucket or pail should be hung or placed on the scale and the pointer should be set to zero.
2. The check weights should be added to the bucket or pail incrementally.
3. The readings on the scale should be recorded at each weight increment and compared to the scale calibration chart.
 - If the readings fall within the expected ranges at each weight increment, the scale calibration should be considered within acceptable tolerances.
 - If the readings are outside of the expected ranges at any of the weight increments, the scale calibration should be considered out of tolerance and the scale should be taken out of service, repaired, or replaced.