



THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Section 11 - Guidelines for Testing & Certification of Measuring, Recording and Sampling Devices or Sensor Systems

Section 11 – Testing & Certification of Measuring, Recording and Sampling Devices or Sensor Systems

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Network. Guidelines. Certification.

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Change Summary

Date of Change	Nature of Change
August 2020	Creation of Overview document.
July 2023	Approved by General Assembly and published.

1 Introduction

This overview summarizes the content of Section 11 of the ICAR Guidelines, introducing the principles and procedures developed for testing and certification of measuring, recording, and sampling devices and sensor systems by ICAR. The guidelines for Section 11 are grouped into five areas, with specific and relevant procedures within each section.

Section A: General Guidelines for Device Certification and System Validation

Section B: Testing of Measuring, Recording, and Sampling Devices for ICAR Certification

Section C: Testing of Sensor Systems for ICAR Validation

Section D: Guidelines and Best Practices for Animal/Sample Identification and Data Handling

Section E: Procedures for ICAR Member and Manufacturer Reporting

2 Device Certification and System Validation

- a. ICAR testing may be of a specific measuring, recording and/or sampling device or of a sensor system that may include a device, animal identification system, controller and/or data transfer protocols.
- b. Device **Certification** is the final stage of the ICAR testing and certification process for measuring, recording and sampling devices. ICAR-certified devices meet the ICAR guidelines provided the manufacturer of the device meets the conditions for certification as outlined in 2.2 of [Procedure 1](#).
- c. System **Validation** is the final stage of the ICAR testing and validation process for sensor systems. ICAR-validated sensor systems have demonstrated through ICAR testing that the system delivers data as described in the test report and the manufacturer of the system meets the conditions for validation outlined in 3.2 of [Procedure 1](#).

3 Definitions and Terminology

Table 1. Definitions of terms used in Section 11.

Term	Definition
Automatic Milking System (AMS)	System that records milk yield and a) takes samples of milk or b) performs milk analysis, without human supervision or interference.
Calibration	Procedure for periodic testing the device or system in the field for accuracy. Calibration may be used interchangeably with periodic check when referring to measuring or recording devices and sensor systems.
Carry-over	Residual milk included in the present milk sample from the previously obtained sample.
Desk review	Review of documentation for the assessment of modifications made on a previously certified device or previously validated system.

Term	Definition
Full test	Test of new recording, measuring or sampling device or test of a sensor system that may include laboratory and field testing by an ICAR Test Centre.
Installation test	A test of the measuring, recording or sampling device or test of sensor system conducted at the time of installation or commissioning to ensure the accuracy of the device or system.
Jar (weigh jar)	Weigh jar (glass or approved plastic construction) used for collecting the milk of the cow at each milking and subsequently estimating yield.
Milk recording and sampling device	A device that i) measures the milk yield per individual milking of an animal (whole udder or per quarter), and ii) provides a representative sample of this milk or performs an on-farm analysis of the milk on relevant parameters (at least fat and protein content).
Modification test	Partial test of a device or a system based on the range/type of changes with respect to the original certified device or validate system.
Routine check	Procedure for periodic testing the device or system in the field for accuracy. Calibration may be used interchangeably with periodic check when referring to measuring or recording devices and sensor systems.
Sensor system	System that measures and provides data on milk yield, SCC, milking speed, animal health, welfare, etc. A system may or may not include an ICAR-certified device and includes other components including, but not limited to, a controller, an automatic identification system, and interface with local or remote computers.
Test Centre (TC)	ICAR-accredited body that conducts tests on measuring, recording and sampling devices or sensor systems.
Test plan	Testing plan developed by the ICAR TC based on the application for testing of a device for certification or a system for validation. The test plan reflects the purpose of the test and is based on the relevant ICAR guideline(s) from Section 11. The test plan may also reference guidelines from other sections of the ICAR guidelines as relevant.

4 Scope

Section 11 of the ICAR Guidelines covers the testing and certification or validation procedures from the submission of the application by the manufacturer to the testing of the device, the device certification or system validation, and the publication of the test results on the ICAR

website. In addition, Section 11 covers the labeling and the routine checking of the certified devices or validated systems. Finally, the annual reporting by manufacturers and ICAR Members regarding certified devices or validated systems is also included in the certification scheme.

Table 2. Steps, actions, and responsibilities in the ICAR certification procedure.

Step	Action	Responsibility
1	Application for device or system testing	Manufacturer (or dealer)
2	Review of application & relevant documentation	ICAR Secretariat & MRSD-SC Chair
3	Selection of Test Centre	MRSD-SC Chair
4	Drafting of test plan	Test Centre
5	Review and approval of test plan	Test Centres & MRSD-SC Chair
6	Issuance of umbrella contract and invoicing	ICAR Secretariat
7	Testing and compilation of report	Test Centre
8	Test report review	MRSD-SC & Test Centres
9	Sharing of test report with applicant & ICAR Board	ICAR Secretariat
10	ICAR certification/validation	ICAR Secretariat
11	Publication on ICAR website	ICAR Secretariat
12	Labeling procedure of certified device	Manufacturer & ICAR Secretariat
13	Annual reporting on certified devices or validated systems	Manufacturer & ICAR Members

Figure 1. Flowchart of testing and certification procedure of devices/systems.

Accuracy and Performance Standard



Quality Assurance and Best Practices

5 Application

The procedure for any type of test and certification or validation starts with an application submitted by the manufacturer/dealer to the ICAR Secretariat. Following the payment of a fixed application fee by the applicant, the ICAR Secretariat checks the application form and related documentation and passes them to the Chair of the ICAR Measuring, Recording, and Sampling Devices Sub-Committee (MRSD-SC), who establishes the test procedures and selects the Test Centre¹ that will carry out the test. An umbrella contract and the invoice are sent to the applicant, who must take care of the payment before the test starts. The ICAR Secretariat coordinates financial transactions between manufacturers, Test Centres, and ICAR.

The Test Centre prepares the test plan, including time schedule and costs. For the test to begin, the manufacturer must send all the necessary devices and accessories to the Test Centre. In addition, all manuals, documents, and procedures should be provided to the Test Centre. The devices and accessories remain under the property of ICAR.

For full details, refer to [Procedure 1](#) - Procedure for Application for Testing of Measuring, Recording and Sampling Devices or Sensor Systems.

6 Testing

6.1 Types of tests

ICAR offers a range of tests based on the device type: i) traditional milk meters or devices, ii) AMS -automatic/robotic milking systems and sampling shuttles or trays, iii) other measuring or recording devices, and iv) sensor devices/systems.

In case of new devices or systems, a full test is carried out, while for modified devices or systems a partial test or a desk review may be required, according to the decision of the MRSD-SC Chair and the Test Centre.

Table 3. Types of tests of measuring, recording, and sampling devices.

Type of device	Link to test procedure
Traditional milk meters	Procedure 4 - Procedure for Testing of Traditional Recording and Sampling Devices
Other measuring devices	
Automatic milking systems	Procedure 5 - Procedure for Testing of Automatic Milk Recording and Sampling Systems
Sensor systems	Procedure 8 - Procedure for Validation of Sensor Systems

6.2 Test Centres

Testing is conducted by ICAR accredited Test Centres¹. Each test is contracted by ICAR to a specific Test Centre. The Test Centre is obliged to act according to the procedures laid down in the test protocols. All details associated with the testing phase, including the test results,

¹ Manufacturers have the possibility to indicate their preferred Test Centre. The final selection is made by the MRSD-SC Chair and the ICAR Secretariat

are kept strictly confidential. Test centres provide periodic reports on tests in progress and provide a review on completed tests to the MRSD-SC.

7 Installation and Routine Calibration Procedures

After installing devices or systems, the performance of the device or system must be tested by means of an installation test. In addition, devices and systems should be checked for accuracy on a routine basis.

The installation test and routine checks are carried out in agreement with the ICAR Member and/or in collaboration with the technician of the manufacturer or authorized dealer. The manufacturer/dealer is responsible for the installation, calibration, and testing of the device or system before the installation test is carried out.

For full details, refer to:

- a. [Procedure 6](#) - Procedure for Evaluation of Installation and Routine Calibration Procedures for Recording and Sampling Devices
- b. [Procedure 9](#) - Procedure for Evaluation of Installation and Routine Calibration Procedures for Sensor Systems

8 Computerized Solutions for Periodic Checking

Computerized methods described in Section 11 can replace the annual routine accuracy test for a device or system. These statistical checks are recommended at least once per year but should be carried out following the manufacturer recommendations. Computerized solutions for periodic checking should not replace the routine maintenance recommended by the manufacturer.

For full details, refer to:

[Procedure 7](#) - Procedure for Computerized Solutions for Periodic Checking of Recording and Sampling Devices

[Procedure 10](#) - Procedure for Computerized Solutions for Periodic Checking of Sensor Systems

9 Automatic Identification and Data Recording

Accurate guidelines of simultaneous and automatic electronic identification usage on test-day are essential to give the most accurate and precise information possible for use in genetic evaluations and management practices.

For full details, refer to Procedure 11 - Guidelines for Data Capture, Connectivity and Credibility when using Automatic Identification and Data Recording Simultaneously.

10 Test-Day Practices for Milk Samples on Individual Animals

Proper test-day practices for milk sampling on individual animals must be followed, to ensure that all milk samples collected on test day be properly linked to the corresponding animal.

For full details, refer to [Procedure 12](#) - Procedure for Test-Day Practices for Obtaining Milk Samples on Individual Animals from Sampling Devices.

11 Test Report and Certification or Validation

Test centres prepare a confidential report of the test results and submit the report to the ICAR Secretariat, who shares it with the MRSD-SC. After a 30-day review and comment period by the MRSD-SC, the Test Centre finalizes the report and submits it to the ICAR Secretariat. The Secretariat forwards it to the manufacturer, together with the ICAR certificate in case of successful test. The report is also shared with the ICAR Board for information.

For full details, refer to [Procedure 2](#) - Procedure for ICAR Certification of Devices and ICAR Validation of Systems.

12 Publication

All ICAR-certified devices and ICAR-validated systems are published on the ICAR website:

- Milk meters – Cows ([link](#)) and Sheep/goats ([link](#))
- AMS and sampling shuttles/trays ([link](#))
- Jars ([link](#))
- Sensor systems (link to be added later)

13 Labeling of certified devices

All ICAR-certified devices must be identified with specific adhesive labels, provided by ICAR through a regular order procedure. The labels must be applied exclusively to the device for which they are intended. Any misuse must be reported to ICAR, who will take the necessary steps to inform the market and ensure that the misuse stops.

For full details, refer to [Procedure 3](#) - Procedure for Labeling of ICAR-Certified Devices.

14 Conditions for the use of ICAR certificates

ICAR certification of a device or ICAR validation of a system requires the manufacturer and the ICAR Members to comply with a number of conditions. In case of sufficient evidence of non-conformance issues, the MRSD-SC will communicate with the manufacturer for response and action. Failure to meet the conditions may lead to the suspension or withdrawal of the certification/validation.

- a. For full details, refer to [Procedure 2](#) - Procedure for ICAR Certification of Devices and ICAR Validation of Systems.

15 Annual reporting

On an annual basis, the MRSD-SC contacts the manufacturers of certified devices and/or validated systems with a request to confirm which of the ICAR-certified devices and/or ICAR-validated systems listed on the ICAR website are still in production and sold in various countries, and to report any possible hardware or software modifications made on the devices or systems since the previous year's report.

For full details, refer to [Procedure 13](#) - Procedure for Annual Reporting of ICAR-Certified Devices and ICAR-Validated Systems in the Marketplace by Manufacturers.

Similarly, ICAR Members are requested annually to report on measuring, recording, and sampling devices or sensor systems in use in their member herds.

For full details, refer to [Procedure 14](#) - Procedure for Annual Reporting of ICAR-Certified Device and ICAR-Validated System Usage and Satisfaction by Member Organizations.

16 Appendices

- a. [\[Appendix 1\]](#) Template for Annual Reporting of ICAR-Certified Devices and ICAR-Validated Systems in the Marketplace by Manufacturers
- b. [\[Appendix 2\]](#) Template for Annual Reporting of ICAR-Certified Devices and ICAR-Validated Systems Usage by Member Organizations