



THE GLOBAL STANDARD
FOR LIVESTOCK DATA

ICAR Guidelines for calibration of the milk meters

Periodic checking of Free Flow (also known as VMS System) milk meter

Version March, 2018

Network. Guidelines. Certification.

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1 Introduction

Periodic checking of MM25 is carried out to ensure that the milk meter's optical and mechanical characteristics have not changed in any substantial way. If this occurs, the meter may measure the milk flow incorrectly.

The principle of the check is a comparison between test values generated at the check and reference values generated at an earlier point. The difference between the reference values and the test values should be as small as possible. This means the meter's measuring capabilities are essentially the same as when the reference values were recorded.

The reference values must be recorded at the start-up of the system and always after calibration of the meters.

Checking is done using a dedicated test probe, which is inserted into the channel of the meter. The optical properties of the probe will cause the milk meter to interpret it as milk.

Note that it is important to use the same test probe from test to test when checking a specific set of meters. The test probes are not interchangeable, hence their unique serial number.

There is a test probe delivered to each VMS farm. The test probe must be kept so that it is not damaged or its optical properties altered.

Preliminary tasks

The following tasks must be done prior to the check to ensure that the tests produce relevant results:

- a. Check which software version the meters currently are running. The test is not valid if the software version has changed. The meters must in this case be calibrated and new reference values generated.
- b. Measuring the air flow through the MM25 milk meters. The air flow through the meters strongly influences the milk-flow figures from the milk meters.
- c. Check of vacuum level. The vacuum level in turn has a direct bearing on the air flow through the system.
- d. Run a system cleaning. The test must not be performed unless the milk meters are clean.

If the test is carried out at the start-up of the system or after calibration; that is, if it is done to generate reference values, do as follows:

- a. Measure the air flow through the MM25 milk meters. The air flow should be about 6.5 litres/min through each meter. Note the reference value on the test form (see below).
- b. Measure the vacuum level. Note the reference value on the test form.
- c. Run a system cleaning.
- d. Note the reference date and the serial number of the test probe on the test form.
- e. Go to "Test using the test probe" below.

If the test is a periodic, follow-up test, do as follows:

- a. On the PC, start Telnet and log on to the milking station as su (super user). Type hardware 7 at the prompt then press the Enter key.
- b. Select option 1 then press the Enter key. This will show all parameters for the MM25 milk meters, including the software version. If the software version is the same as for the previous test, continue with step 3. If not, calibrate the meters and generate new reference values.
- c. Measure the air flow through all MM25 milk meters. The air flow should be about 6.5 litres/min. In addition, the value must not deviate more than 10 per cent from the reference value. Note the current value on the test form.
- d. Measure the vacuum level. The current value must not deviate more than 2.5 kPa from the reference value.
- e. If the values for air flow and vacuum level fall within the acceptable margins, run a system cleaning and go to "Test using the test probe" below.
- f. If, on the other hand, the values for air flow and vacuum level fall outside the acceptable margins, calibrate the MM25 milk meters and calculate a new Offset and Scalefactor. (See separate instruction for calibration below.) Then continue with system cleaning and test using the test probe.

2 Test using the test probe

- a. Clean the test probe using mild detergent and water. Rinse and dry. Note that even minor changes or deposits on the probe's surface will affect the test result.
- b. Close the gates of the milking station and put the station in manual mode.
- c. On the PC, start Telnet and log on to the milking station as su (super user).
- d. Type hardware 7 at the prompt then press the Enter key.
- e. Select option 3 then press the Enter key. This will set all meters in technical mode.
- f. Disconnect tubes and elbows from the underside of the meters. Check that all meters are clean and dry.
- g. If the message Hxxx is shown on any meter, wait until it disappears. This message means that the meter's temperature is not yet stable.
- h. If the meters are dry they will now perform a selftest. The result will be shown as Cxxx where xxx is a number in the interval 85-100. This means the selftest has succeeded.
- i. If the message Cxxx is not shown, or if the message SRVx is shown, this means the selftest failed. In this case, see "If the selftest fails" below.
- j. Insert the test probe in one of the meters. The meter will show PASS and two values after a few seconds. The two values represent minimum and maximum flow. The values are shown as fourdigit numbers and normally lie in the interval 3.0004.000 kg/min.
- k. Fill in the minimum and maximum flow under Current MinF and Current MaxF respectively on the test form. (See below for the test form.)
- l. Calculate Ratio min = Ref MinF / Current MinF and Ratio max = Ref MaxF / Current MaxF. Ref MinF and Ref MaxF are the Current MinF and Current MaxF that were

generated during the start-up of the system (or after a calibration of the meters); that is, they are the reference values against which the new Current MinF and Current MaxF will be compared.

- m. Fill in the Ratio min and Ratio max on the test form. If the two values lie inside the interval 0.98 1.02, the meter is working properly. If the values lie outside this interval, the meter failed the test. In this case, see “If the test using the test probe fails” below.
- n. Repeat steps 10-13 for the remaining meters.
- o. When all tests have been performed, mount elbows and refit tubes.
- p. Finish by setting all meters in non-technical mode: select option 5 from the main menu in the hardware program.

It the selftest fails:

- a. If one of the meter’s selftest fails, dry and, if necessary, clean the meter’s channel. Be careful so that you do not damage the meter.
- b. Wait for the result of the selftest.
- c. If the selftest once again fails, select option 11 (RECAL one FF) from the main menu in the hardware program.
- d. If the selftest despite this fails, replace the meter.

If the test using the test probe fails:

- a. If the test with the test probe fails for one of the meters, clean and check that the channel is not damaged. Dry the channel.
- b. Make sure the test probe is clean.
- c. Carry out the test once more
- d. If the values still lie outside the interval, replace the meter.

Calibration procedures for ICAR certified meters

VMS System DeLaval Milk Meter

Version March, 2018

Periodic routine test form, VMS milk meters MM25VCC

Farm:	VMS:	Reference date:	Test date:

Parameter	Reference value	Current value	Difference	Max. deviation	Pass/Fail
Vacuum level				2.5 kPa	
Milk tube length				< 10 %	
Air inlet				+/- 10 %	
Test probe serial number:					

	VMS 1				VMS 2			
MM 25#								
Ref. offset								
Curr. offset								
Ref. scalefactor								
Curr. scalefactor								
Ref. sub SW								
Curr. Sub SW								
Ref. minF								
Ref. maxF								
Curr. minF								
Curr. maxF								
Ratio min.								
Ratio max.								
Pass/Fail								

Ratio min. = Ref. minF / Curr. minF

Ratio max. = Ref. maxF / Curr. maxF

Ratio min. and ratio max. should lie in the interval 0.98-1.02.