International
Committee for
Animal Recording

1. PERIODIC CHECKING OF APPROVED METERS. HINTS FOR THE SAMPLE TAKER AND FARMER

2. PERIODIC CHECKING OF JARS

JUNE 2016

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Table of content

AFIFLO 2000 MILK METER

General

- The periodic checking will be done at least once in every 12 months.
- The testing procedure with water should be carried out with milk meters that are cleaned properly.
- Meters should be prepared to the test according to instructions in SAE Afikim's Afiflo 2000 installation Manual, p/n 904139, chapter 9, sections: "Checks before installation" and "Additional checks".

Reference value

- The reference value is calculated difference in kg between the reading of the milk meter and weighted amount of water which has passed the milk meter.
- The "reference value" of the "AFIFLO 2000" milk meter is the average of the two measurements with water, found during the testing procedure with water of the installation test or a reference value determined later.
- When proceeding to periodic checking, the reference values are handed over for support.

Required equipment

A Fullwood sucking set:

- Sucking pipe with a rubber cap and with a sucking opening of 3.5mm, air inlet of 1mm, which provides 7-8 LPM (liter per minute).
- Locate a clip tap near the milk meter body (around 10-20 cm).
- The same sucking set should be applied in both tests (reference value and periodic checking).
- Electric weigh-beam/bascule.
- Some buckets of sufficient capacity.
- Some receivers for the collecting of testing liquid.
- Thermometer.

Testing liquid

- Water with a temperature of 20° C±5° C.
- Addition of around 60 grams of salt per 20kgs of water. The conductivity of the testing liquid should end-up with 12 at the display.

The principle of the test

- Fill a bucket with 20 kg of testing liquid.
- Suck a quantity of testing liquid until 12 kg is shown on the display. Stop the water when the milk meter valve is opened.

- The flowed - and collected quantity of water will be weighed and recorded.
- The testing liquid should provide minimal 10.5 conductivity measured during the test by using the milk meter conductivity (button ↗ or display) and written on the form. If less then 10.5 add more salt (5-10 grams) to around 12 conductivity.

Quality of the observations/measurements

" If the first measurement value deviates 0.1 kg from the reference value: meter is correct.

" If the first measurement value deviates more than 0.1kg from the reference value, proceed to a second measurement.

" If duplicate measurements have an average deviation of 0.2 kg or less from the reference value: meter is correct.

" The difference between duplicate measurements should not exceed 0.1kg.

Figure 1. The AFIFLO 2000 milk meter and the different components.

Deviating meters

"When the measurements do not come up to the standard, the testing procedure with water should be repeated after checking the equipment, which may include, among other things, remeasuring the conductivity of the testing liquid, the air flow of the sucking set, tilting of the milk meter body, straightening up, and if necessary, dismantling of the meter. If it is still impossible to come up to the standard, the meter should be calibrated/adjusted or replaced.

Replacement or repair of meters

- When meters are replaced or when repairs influence the measurement, the meters are to be tested during the milking, after which the testing procedure with water should be carried out twice.
- This water test will then serve as "reference value".

Reporting the results

The results of the periodic checking of the milk meters, as well as interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, tot he main supplier and to the national milk recording organisation.

Sampling equipment

- Check the sampling equipment for cleanness and parts

See to it that the sampling equipment is stored in a dry place, free from dust.

Hints for the sample taker and the farmer for correct sampling

Guide lines from S.A.E. Afikim.

Before sampling

See to it that:

- The meters are cleaned properly
- The air inlet of the claw is opened
- The meter and the sampling equipment are suspended upright
- All equipment for sampling contains no water residues. (Uncarefulness in this matter leads to a too low indication of percentages, especially where the first range of cows is concerned.

Taking the sample

- The display of the meter should always be at zero before starting to milk another cow;
- After the cow is off, the sample taker must observe a waiting time before reading off the display and before removing the sample bottles;
- This waiting time (about 15 seconds) is necessary for complete discharging of the last portion;
- When removing the filled sample bottles, a well-emptied sample bottle should be put in simultaneously;
- Then turn over the sample bottle several times transfuse the milk in the mixture bowl and take a sample be means of the sample spoon;
- It is to be recommended to use a draining rack for good emptying of bowls and bottles;
- It is desirable, that there are some sample bottles extra on the farm during the milk recording. It is strongly advised not to use bottles with colored glass.

The operational panel

- One should press the "start button" twice, shortly one after the other, when the milking set is kicked off and "automatic removal" occur, in order to retain the milk quantity that is already measured;
- After taking the meter reading, the meter should be set to zero again.

After sampling

- The farmer removes the bottles and the sample equipment for a careful cleaning by hand;
- Store the sample equipment and bottles on a dry place, free from dust.

AFIFREE MILK METER

General

- Perform the periodic check at least once every 12 months.
- Clean milk meters thoroughly before performing the periodic check.

Reference Value

- The "reference value" is the difference in Kg between the reading of the milk meter and the weighed amount of water that has passed through the milk meter.
- The "reference value" of the "AFIFREE" milk meter is the average of the two water measurements found during the water test procedure of the installation test or a reference value determined later.
- During the first periodic check, save the reference values for use in future annual checks.

Required Equipment

The Afikim's sucking set:

- The Sucking Unit with a 3.5mm sucking opening, which provides 4±1 LPM water flow.
- The Air Admission Unit with a 1mm air inlet, which provides 10±3 LPM air flow. The Air Admission unit must be attached close to the Milk Meter Inlet with the air admission hole facing upward.
- A clip-tap located before the air admission unit.
- Bucket of sufficient capacity.
- The internal diameter of piping connecting the milk meter and bucket for nipples and rubber pipes must be at least 16mm.
- Electric scales.
- Level.
- Airtight container for collecting testing liquid.

Before the test

Ensure that the sucking set is clean and all its holes are open.

It is recommended to use the same sucking set for the same milk meters each year.

Ensure that all pipes, fittings, buckets and clip-tap are in the good condition.

Check that Milk Meter is leveled.

To Prepare Testing Liquid

The target is to achieve a normal solution of saltwater with a conductivity value of 10.1±0.3 (in AfiFree conductivity units).

1. Initially take 20 Kg of water at approximately ambient temperature.
2. Add about 80 g of salt and mix thoroughly.
3. Measure liquid's conductivity value:
   a) When Milk Meter is in the cleaning mode, perform "double click" on Start/Stop button. Display will show conductivity (in AfiFree conductivity units).
   b) Without pressing on Start/Stop button, pass all the liquid through the milk meter to measure the conductivity value.
4. If the required conductivity value is not achieved:
   - if the measured value is less than the target value, add more salt
   - if the measured value is greater than the target value, add more water

For example:
Start with 20Kg of water and add 80 grams of salt. Measure the conductivity and add water or salt to reach a conductivity value between 9.8 and 10.4 units.

The principle of the test

1. Fill a bucket with at least 20 Kg of Testing Liquid.
2. Press Start/Stop button to start measuring.
3. Open clip-tap to suck in the Testing Liquid.
4. Stop the water by closing of clip-tap when the display shows ~ 10.0 kg.
5. Wait until all remaining water flows into the airtight container.
6. Press Start/Stop button to finish measuring.
7. Weigh and record the collected water in the airtight container and proceed as follows:
   - If the first measurement value deviates by 0.1 Kg or less from the reference value: the meter is correctly calibrated.
   - If the first measurement value deviates by more than 0.1Kg from the reference value, perform a second measurement.
   - If duplicate measurements have an average deviation of 0.2 Kg or less from the reference value: the meter is correctly calibrated.

Inaccurate Meters

If the measurements do not conform to this standard, check the equipment and repeat the water testing procedure. Equipment checks include the following:

- Re-measure the conductivity of the testing liquid.
- Ensure that the milk meter body is level.

If it is still impossible to conform to the standard, the meter should be calibrated/ adjusted or replaced.

Replacement or Repair of Meters

After replacing the meters, or when repairs affect the measurement, test the meters during milking. After this perform the water test procedure twice. This water test will then serve as the new "reference value".

Reporting Results

The following results must be reported:

- Periodic checks of the milk meters.
- Interim changes to milk meters and parlor configuration.
- Checks carried out following these changes.

To those concerned, including:

- The farmer.
- The main supplier.
- The national milk recording organization.

Storage of the checking equipment

1. Inspect the checking equipment for cleanness and parts.
2. Store the checking equipment in a package in a dry and free from dust place.

AFIKIM MILK METERS

also called - Fullflow
- Manuflow
- Sureflow
- Afikim/Combina

Frequency of periodic checking at least once in 12 months.

General

The testing procedure with water should be carried out with milk meters that are cleaned properly.

Reference value

- The "reference value" of the "Afikim/Fullflow" milk meter is the average of the two measuring with water, found during the testing procedure with water of the installation test or a reference value determined later.
- When proceeding to periodic checking, the reference values are handed over for support.

Required equipment

- A Fullwood sucking set:
  - Sucking pipe with a rubber cap and with a sucking opening of 3.5 mm.
  - Air inlet of 1 mm.
- Electronic weigh-beam/Basle.
- Some buckets of sufficient capacity.
- Some receivers for the collecting of testing liquid.
- Thermometer.

Testing liquid

- Water with a temperature of 20 C +/- 5 C.
- Addition of 60 grams of salt per 20 kg of water.

The principle of the test

- Fill a bucket with at least 15 kg of testing liquid.
- Suck a quantity of testing liquid till 12 kg is shown at the display.
- The flowed - and collected quantity of water will be weighed.

Quality of the observations/measurings

- If the first measuring value deviates 0.1 kg from the reference value: meter = correct.

- If the first measuring value deviates more than 0.1 kg from the reference value, proceed to a second measuring.
- If duplicate measuring have an average deviation of 0.2 kg or less from the reference value: meter = correct.
- The difference between duplicate measuring should not be bigger than 0.1 kg.

Deviating meters

- When the measuring do not come up to this standard, the testing procedure with water should be repeated after checking the equipment, which may include, among other things, straightening up, and if necessary, dismantling of the meter.
- If it is still impossible to come up to this standard, the meter should be recalibrated/adjusted or replaced.

Replacement or repair of meters

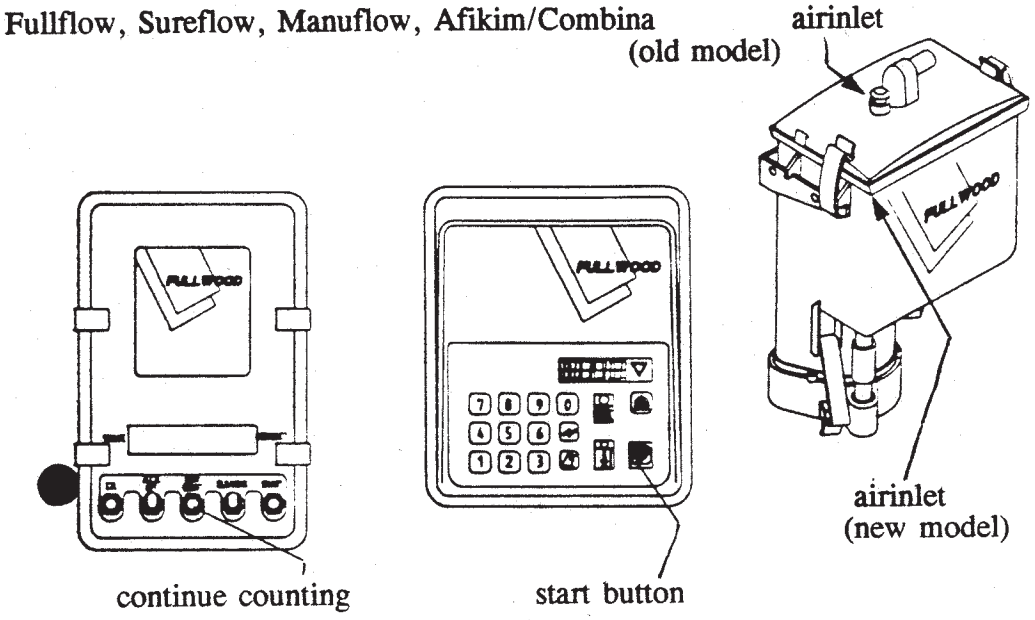
- When meters are replaced or when repairs influence the measuring, the meters are to be tested during the milking, after which the testing procedure with water should be carried out twice.
- This water test will then serve as "reference value".

Reporting the results

The results of the periodic checking of the milk meters, as well as interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milk recording organization.

Sampling equipment

- Check the sampling equipment for cleanness and parts.
- See to it that the sampling equipment is stored in a dry place, free from dust.



Hints for the sample taker and the farmer for correct sampling by means of Afikim:

Before sampling

See to it that:

- the air inlet in the milk claw is opened;
- the air inlet of the meter is cleaned and opened (blockage causes a delayed operation of the valve, extra foam formation and deviations in measuring quantities and con-tents). The air inlet of the meter is on the cover (older types of milk meters) or in the housing of the milk meter in the top of the bypass canal (new type);
- the meter and the sampling equip-ment are suspended upright;
- the sampling equipment is placed in such a manner, that the arrows on the sampling equipment point in the direction of the milk flow;
- all equipment for sampling contains no water residues. (Uncarefulness in this matter leads to a too low indica-tion of percentages, espe-cial-ly where the first range of cows is concerned).

Taking the sample

- the display of the meter should always be at zero before starting to milk another cow;
- after the cow is off, the sample taker must observe a waiting time before reading off the display and before removing the sample bottles;

- this waiting time (± 30 seconds) is necessary because of the presence of foam in the meter - foam chan-ges into milk -;
- when removing the filled sample bottles, a well-emptied sample bot-tle should be put in simultaneously;
- then turn over the sample bottle several times, transfuse the milk in the mixture bowl and take a sample by means of the sample spoon;
- it is to be recommended to use a draining rack for good emptying of bowls and bottles;
- it is desirable, that there are some sample bottles extra on the farm during the milk recording. It is strongly advised not to use bot-tles with colored glass.

The operation panel

- two types of the meter are avail-able, i.e. with a standard panel or with an information panel (see above);
- on the standard panel, the middle switch "Continue Counting" is a switch to continue the same count-ing and is used when a milking set is kicked off. In such a case, the measured quantity of milk remains on the display and will be added to the measured quantity after replacement of the teat cups;
- at farms where milk meters with information panels are installed, one should press the "start but-ton" twice, shortly one after the other, when the milking set is kicked off, in order to retain the milk quantity that is already measured;
- after taking the meter reading, the meter should be set at zero again. In case of a standard panel the two outer switches "CR" and "Start" must be pressed simultaneously. In case of the information panel, the "start" and "take off" keys (above the start key) should be pressed simultaneously.

After sampling

- the farmer removes the bottles and the sample equipment for a careful cleaning by hand;
- store the sample equipment and bottles on a dry place, free from dust.

Farmer, do rinse your equipment with acids on a regular basis!

BOU-MATIC M+ MILK METER

Frequency of periodic checking at least once in 12 months

General

- The testing procedure with water should be carried out with milk meters that are cleaned properly.
- Grease the bottom of the rotor with a thin coat of water test fat, especially meant for this purpose.

Reference value

For the Bou-Matic milk meter, a fixed standard is used 12.5 kg; +/- 0.2 kg) instead of a "reference value". Moreover, when proceeding to periodic checking, results of former checks are handed over for support.

Required equipment

- A Bou-Matic sucking set:
  - Tube with flow restriction with a sucking opening of 4.1 mm.
  - Air inlet of 2.5 mm.
- Electronic weigh-beam/bascule.
- Some buckets of sufficient capacity.
- Some receivers for collecting testing liquid.
- Thermometer.

Testing liquid

- Water with a temperature of 20 C +/- 2 C.
- No addition of salt or acids.

The principle of the test

- Suck at least 12 kg of testing liquid.
- Read the display value.
- The display value has to be 12.5 kgs +/- 0.2 kg.

Quality of the observations/measuring

- If the fist measuring lies within the area between 12.4 and 12.6 kg: meter = correct.
- If the first measuring gives a value of 12.3 or 12.7 kg, a second measuring should be car-ried out. For acceptance, the values have to lie within the area between 12.3 and 12.7 kg.
- The difference between duplicate measuring should not be bigger than 0.1 kg.

Deviating meters

- The deviating meters are subjected to a visual check and where possible simple faults are rectified. After this check, two measuring per meter are carried out. If the values that are found are 12.5 kg +/- 0.2 kg, the meters are accepted. Of course, the duplicate values may not differ more than 0.1 kg.
- Meters, which do not come up to these fixed standards, should be corrected or replaced.

Replacement or repair of meters

When meters are replaced or when repairs influence the measuring, the meters are to be tested during the milking, after which the testing procedure with water should be carried out twice.

Reporting the results

The results of the periodic checking of the milk meters, as well as interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milk recording organization.

Sampling equipment

- Check the sampling equipment for cleanness and parts.
- See to it that the sampling equipment is stored in a dry place, free from dust.
- Avoid direct sunlight.

Hints for the sample-taker and the farmer for correct sampling by means of Bou Matic M+

Before sampling

See to it that:

- the air inlet in the milk claw or teat cups is opened;
- the air inlet in the lid is opened (blockage delays the milk drainage);
- the sample test equipment - the Orion - is installed cor-rectly;
- the equipment for the sample test contains no water residues. (Uncar-efulness in this matter leads to a too low indication of percentages, especially where the first range of cows is concerned).

Taking the sample

- the display of the meter should always be at zero before starting to milk another cow;
- as soon as the cow is connected and the milk yield passes 1.5 kg, the rotor starts and the display counts;
- when the cluster is kicked off by the cow, and replaced by the milkier within 30

- seconds, the obtained quantity of milk will be added tot the measured quantity after replacement (press the button Manual);
- after the cow is off, the sample taker must observe a 30 seconds' waiting time. This time is needed to enable the meter to drain the remaining 1.5 kg of milk.

Directions for use of the sampling equipment

a) Place the sample tube with a turning and pushing movement in the tube holder. The sample tube has to be hold a little slant.

b) Keep to the following procedure for the sample taking:

1. turn the sample cock in milking position;
2. check during milking whether the equipment separates the milk in the sample tube, until the cow is off and the milk meter is totally empty, so also the last 1.5 kg;
3. when the milk meter is totally empty, turn the sample cock 180° in drain position;
4. remove the sample tube of the equipment;
5. turn the top on the sample tube and shake it at least 5 seconds to mix the milk;
6. Take the sample for caliber analyzing;
7. Place the second sample tube in the holder;
8. turn the sample cock again 180° in milking position.

Important

Take off the drain-cock before removing the water residues. Also remove the water out of the preformed nylon tube.

After sampling

- the sample test equipment is cleaned during the normal cleaning procedure of the milking equip-ment.
- store the sample test equipment till the following sample test on a dry place, free from dust.

Farmer, do rinse your equipment with acids on a regular basis!

BOUMATIC PERFECTION 3000 AND BOUMATIC SMARTCONTROL METER (also called PerfectionMetrix 3000)

Periodic Check of Milk Meters in a TouchPoint or ViewPoint Milking System

Scope

- A Periodic Check of Milk Meters in parlor should be carried out once every 12 months.
- Equipment needed to perform a Periodic Check of Milk Meters
- Procedure to correctly perform a Periodic Check of Milk Meters in the parlor.

Test Equipment and Preparation

Tap water, 4 to 30 degrees C, no added salts or acids ..... a/r
[1,2]Milk hose, 5/8 inch or 16 mm ..... a/r
Milk Bucket or Pail ..... 1 per Milk Meter under test.
[1]Test orifice (3556645) . ..... 1 per Milk Meter under test.
Milk Bucket or Pail to weigh water in 1
Digital hanging scale 1
Scale specifications:
Accuracy: ..... 0.2% of Full Scale
Resolution: ..... 0.02 Pounds/20 grams

Note:

[1]Part available from BouMatic.

[2]Abbreviation a/r means "as required".

[3]A technician can handle up to 4 sets simultaneously (under normal conditions)

Note

A hanging scale is recommended. A floor scale can be inaccurate when placed on plastic or rubber floor mats.

Note

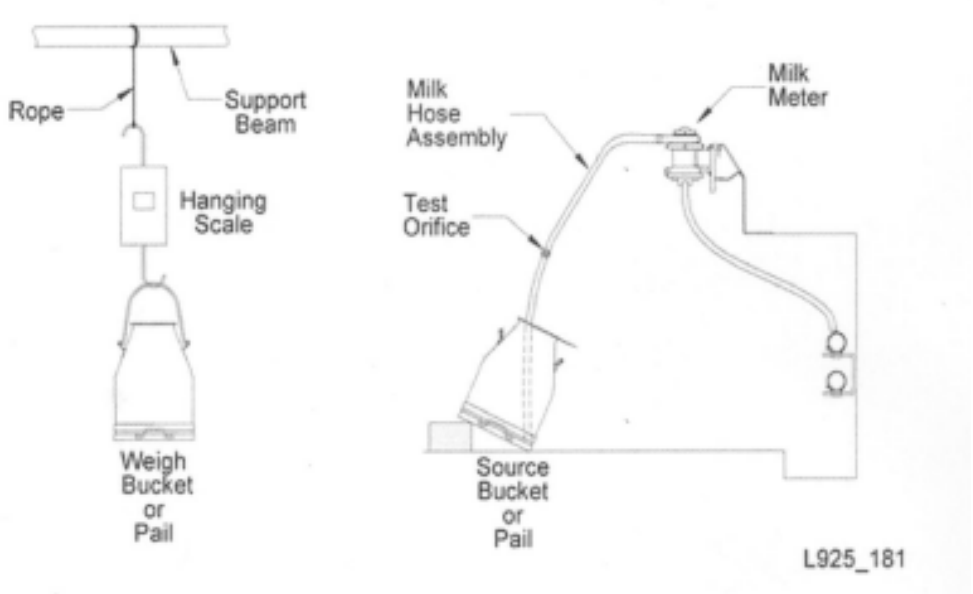
- Insure that all Milk Meters are repaired, clean inside, and free of all debris.
- Insure tire Milk Meter is reassembled correctly so that all Turn Rings are tight and the Outlet of the Milk Meter is fully turned to the stop position.

Note

All controls in the TouchPoint and ViewPoint parlor must be properly addressed. A control with address "0" is not a valid address and will not give valid production results.

Test Procedure, Water Test of Milk Meters in Parlor

1. Set up the milking parlor in the "Milk" mode.
2. With the milking parlor setup in the "Milk"' mode, the water used an the water test will be metered through the Milk Meter and then be drawn Into the Pipeline, It Is very important to insure that this water does not go into the milk bulk tank.
3. Using the Hanging Scale, weigh exactly 10,00 Kg of water and pour the water from the Weigh Bucket or Pail to the Source Bucket or Pail as shown in Figure 1.
4. Tilt the Source Bucket or Pail as shown in Figure 1.
5. Attach one end of the Milk Hose Assembly with the Test Orifice In the center to the inlet of the Milk Meter as shown in Figure 1.
6. Put the other end of the Milk Hose Assembly into the Source Socket or Pail and insure the end of the Milk Hose Assembly is at the very bottom of the tilted Source Bucket or Pall as shown in Figure 1.
7. Place the TouchPoint or ViewPoint control in the "Attach" mode and verify the control displays 0.00 Kg at the beginning and starts to count up production as the water is metered through the Milk Meter.
8. Insure that ALL the water is the Source Bucket or Pail is metered through the Milk Meter and allow the TouchPoint or ViewPoint control to "Detach" automatically.
9. Record the production that the TouchPoint or ViewPoint control displays.



Reference Values for Milk Meters and Parlor

- In order to do a periodic check of the Milk Meters in the parlor, a Reference Value must be available for each Milk Meter in the parlor.
- At the start up of the parlor, Water tests should have been done and a Reference value report should have been generated that shows the following:
  - The Parlor Adjustment Factor.
  - The raw water test data for each Milk Meter in the parlor.
  - The Reference Value for each Milk Meter in the parlor.
  - The calculated Individual Adjustment Factor for each milk meter in the parlor
  - The calculated Reference Value if the Individual Adjustment Factor is set in the SmartDairy Management PC application for each Milk Meter in the parlor.
- If a Reference Value is not available for the Milk Meters in the parlor, then water tests to create a Reference Value must be done and a report generated for future Period Checks of the Milk Meters in the parlor.

Procedure for Periodic Checking of Milk Meters

1. Using the Reference Value report verify the same Parlor Adjustment Factor is set in the SmartDairy Management PC application.
2. Using the Reference Value report verify the same Individual Adjustment Factor for the Milk Meters in the parlor are set in the SmartDairy Management PC application.

   Note: For Instructions on how to set the Parlor Adjustment Factor and the Individual Adjustment Factor for Milk Meters in the parlor, go to the "Help" menu of the SmartDairy Management PC application.
3. For each Milk Meter perform the first Water test on all Milk Meters and record the results of the water test.
4. If the results of the first water test deviate 0.1 Kg or less from the Reference value, the Milk Meter is considered correct
5. if the results of the first water test deviate more than 0.1 Kg from the Reference Value a second water test is required.
6. If the average deviation from the first and second water tests is less that 0.2 Kg from the Reference Value, the Milk Meter is considered correct.
7. If the average deviation from the first and second water tests is more than 0.2 Kg from the Reference Value, a third water test in required.
8. Throw out the results from the first Water test. The first water test after a Milk Meter is reassembled can be inaccurate
9. If the .average deviation from the second and third water tests is less than 0.2 Kg from the Reference Value, the Milk Meter is considered correct.

10. If the average deviation from the second and third water tests is more than 0.2 Kg from the Reference Value, the Milk Meter requires service.

DAIRY MANAGER MILK METER

Frequency of periodic checking at least once in 12 months.

General

The testing procedure with water should be carried out with milk meters that are cleaned properly.

Reference value

- The "reference value" of the "Dairy Manager" milk meter is the average of the differences between the display-value and the value indicated by the weigh-beam/bascule, recorded during the water test of the installation test, or a reference value which is deter-mined subsequently.
- When carrying out the periodic checks, the reference values are handed over for support.

Required equipment

- A Surge sucking set:
  - Tube with flow restriction with a sucking opening of 5 mm.
  - Air inlet of 1 mm.
- Electronic weigh-beam/bascule.
- Some buckets of sufficient capacity.
- Some receivers for collecting the testing liquid.
- Thermometer.

Testing liquid

- Water with a temperature of 15 C +/- 5 C.
- No addition of salt or acids.

The principle of the test

a Milk meters with a meter control mode.
  - Put the left switch in the "wash off"-position.
  - Put the right switch in the "DHIA-on"-position.
  - Press the button on the milk meter, so that neither milk yield nor serial number are shown at the dis-play.

b Milk meters linked with milking stud operation panels of Surge Euro Line or Nedap-Poiesz:
  - In case of a fish-bone milking stud, close the exit fences.

- In case of an open tandem stud, cover the electronic eye by, for example, a cloth and wait until the question "COW?" appears on the screen.
- Put the meters in the checking position; sequence of keys: upper left, upper right, lower left, lower right and wait until "DHIA" appears on the milking operation panel.
- Press the button on the milk meter, so that neither milk yield nor serial number are shown at the display.
- Fill a bucket with ± 12 to 13 kg of testing liquid.
- Suck at least 9 kg of liquid through the meter, though not more than 9.9 kg at the display.
- Block the sucking tube - with closed valve - when reaching this quantity.
- Take the milk meter reading.
- Weigh the quantity of testing liquid in the receiver.
- Press the button on the milk meter and let the remaining testing liquid flow away (not into the receiver!).
- At a second measuring, press the button once again, so that the milk yield is no longer shown at the display.
- Calculate the difference between the display-value and the sucked quantity of testing liquid.
- Switch the meters into the original position.

Quality of the observations/measuring

- If the first measuring value deviates 0.1 kg from the reference value: meter = correct.
- If the first measuring value deviates more than 0.1 kg from the reference value, proceed to a second measuring.
- If duplicate measuring have an average deviation of less than 0.2 kg from the reference value: meter = correct.
- The difference between duplicate measuring should not be bigger than 0.2 kg.

Deviating meters

When the measuring do not come up to this standard, the testing procedure should be repeated after checking and, if necessary, dismantling of the meter. If it is still impossible to come up to this standard, the meter should be recalibrated/adjusted or replaced.

Replacement or repair of meters

- When meters are replaced or when repairs influence the measuring, the meters are to be tested during the milking, after which the testing procedure with water should be carried out twice.
- This water test will then serve as "reference value".

Reporting the results

- The results of the periodic checking of the milk meters, as well as interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milk7.
- When the sensor-value is changed, the new sensor-value is to be recorded on the measuring form.

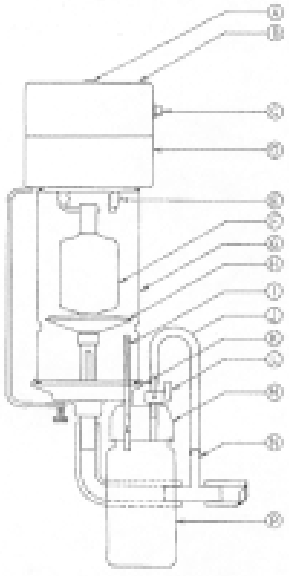
Sampling equipment

- Check the sampling equipment for cleanness and parts.
- See to it that the sampling equipment is stored in a dry place, free from dust.

Hints for the sample-taker and the farmer for correct sam-pling by means of Dairy Manager

Preparation for sampling

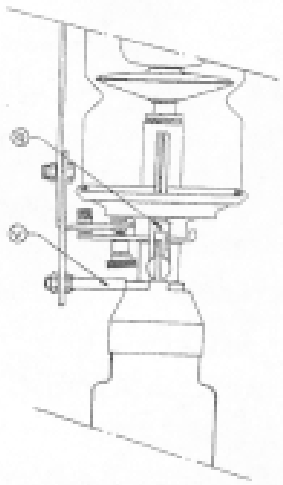
- switch the milk meter control mode in the "WASH OFF"- and "DHIA ON"- position or type this on your key-board if the milk meters are lin-ked to a Surge Euroline computer;
- see to it that the air inlet in the claw is opened;
- make sure that all equipment is clean and that it contains no water residues. (Uncarefulness in this matter leads to a too low indicati-on of percenta-ges, es-pecially where the first range of cows is concerned).



Front view

Names of the parts

a) Aled (light emitting diode/signal lamp)
b) display (milk yield and cow number
c) push-button
d) milk meter top
e) sensor
f) float
g) glass
h) valve
i) sample pipe
j) vacuum tube
k) lower lid
l) vacuum tap
m) upper cove
n) T-junction
p) sample bottle
q) sample tube
v) support



Side view

Connecting the sampling equipment

- take the vacuum tube (J) from the sample pipe (I);
- put the upper cover (M) on the sample pipe (I) en check if the upper cap fits well on the lower lid (K); (origi-nal position of the sampling part);
- put the upper cover (M) into the support (V) and press the sample tube (Q) on the sample pipe (I); (new position of the sampling part);
- attach the vacuum tube (J) to the vacuum tap (L). The handle of the tap should point upwards;
- after the vacuum pump has started and the installation is set under vacuum, the sample bottle (P) can be pres-sed into the upper cover (M).

Taking the sample

- the display of the meter should always be at zero before starting to milk another cow;
- when the cow has finished milking, press the push-button (C) for the last dump;
- wait for approximately 3 seconds until the valve (H) falls back in its original position;
- take the meter reading of the milk yield from the display (B);
- turn the handle of the vacuum tap (L) a quarter turn to the right;
- take out the sample bottle (P) and empty it in the mixture bowl. Trans-fuse the milk 3 times and take a sample by means of the sample spoon;
- press the push-button (C) once again, so that the display (B) skips to zero;
- open the vacuum tap (L) again;
- press the sample bottle (P) again into the upper cover (M);
- take care that the upper cover (M) fits well upon the lower lid (K); (original position of the sampling part);
- it is recommended to hold several sample bottles in reserve;
- place the used sample bottles upside down to leak.

After sampling

- replace the tube (J) on the sample pipe (I);
- clean the upper cover (M), the vacuum tap (L) and sample bottle (P) properly and store them on a dry place, free of dust.

Farmer, do rinse your equipment with acids on a regular basis!

DAIRYMASTER WEIGHALL MILK METER

General

- The test procedure with water should be carried out with milk meters that are cleaned properly.

Test liquid

- Plain water, temperature not critical, no addition of salt or acids.

Reference values and principle of the test method

- The reference value is settled at the installation test with milk.
- Fill a bucket with approximately 14-15 kg test liquid (water).
- Weigh the bucket with test liquid.
- Absorb a quantity of water till ± 10 kg on the display.
- For sucking up the water, a suction tube is used with a suction opening of 5mm and an air inlet of 1 mm.
- Read the display value.
- Weigh the amount of residual water in the bucket.
- Calculate the amount of test liquid which passed the meter.
- Calculate the difference between the display value and the sucked quantity of test liquid.
- Repeat the measurement and calculate the difference between the display value and the sucked quantity of test liquid.
- The two values should be within 0.1 kg. If not, proceed to a third measurement.
- The reference values is the average of the calculated differences.
- The reference value for each meter is noted and will be used for the next routine tests, to compare with.

Routine test

- Fill a bucket with approximately 14-15 kg test liquid (water).
- Weigh the bucket with test liquid.
- Absorb a quantity of water till ± 10 kg on the display by using the suction tube.
- Read the display value.
- Weigh the amount of residual water in the bucket.
- Calculate the amount of test liquid which passed the meter.
- Calculate the difference between the display value and the sucked quantity of test liquid.
- If the difference is less than 0.1 kg from the reference value: the meter is correct.

- If the first measuring value deviates mores than 0.1 kg from the reference value, proceed to a second measurement.
- If the duplicate measurements have an average deviation of 0.2 kg or less from the reference value: the meter is correct.
- If the duplicate measurement have an average deviation of more than 0.2 kg: the meter is not correct. Meter should be repaired, recalibrated with milk followed by adjustment of the calibration factor.

Visual check

- During the routine check, the meters should also be checked on cleanliness, fixation of the meter, correct operation of valves, leakage and so on.
- Also check the sample flasks.

JM 100 MILK METER

Frequency of periodic checking at least once in 12 months.

General

- In practice, the JM milk meter is used in three different situations.
  a. JM 100, Super Servo; the basic equipment. The JM 100 is linked with the control panel for milking, sampling and cleaning functions. The JM 100, Super Servo has no digital reading-off.
  b. JM 100, Alfa display: digital reading-off. The control panel for the various functions is linked with a display panel for digital reproduction of the measured milk quantity.
  c. JM 100, Alfa Display system. The digital reading-off is connected with a computer system.
- In all situations where a JM 100 milk meter is installed, there has to be an airinlet of 0.85 mm for obtaining the right contents.

Periodic checking of a "JM 100, Super Servo"

Periodic checking is the same as used for jars.

Periodic checking	b. JM 100, Alfa Display
	c. JM 100, Alfa Display System

Reference value

Instead of a "reference value", a fixed standard (9.7 - 10.1 kg) is used for all JM 100 milk meters. Moreover, when proceeding to periodic checking, results of former checks are handed over for support.

Required equipment

- No specific sucking set.
- A milk tube is used for sucking the water.
- The outlet tube from the meter to the receiver must be provided with a tube clip, with which the outlet can be slowed down.
- Electronic weigh-beam/bascule.
- Some receivers for collecting testing liquid.
- Some buckets of sufficient capacity.
- Thermometer.

Testing liquid

- Water with a temperature of 20 C +/- 5 C.
- No addition of salt or acids.

The principle of the test

- Fill the jar with ± 15 kg of testing liquid.
- Empty the jar by means of the JM 100 pump till 10 kg is shown on the display and collect this quantity of testing liquid in the receiver.
- This quantity of testing liquid is weighed and should be between 9.7 and 10.1 kg.

Quality of the observations/measuring

- If the first measured value lies within the area between 9.8 and 10.0 kg: meter = correct. If the first measuring has a value of 9.7 or 10.1 kg, a second measuring should be carried out.
- If both measuring give values within the area between 9.7 and 10.1 kg: meter = correct.
- The difference between duplicate measuring should not be bigger than 0.2 kg.

Deviating meters

Meters that do not come up to the standard of 9.7 - 10.1 kg should be tested with water after checking and, if necessary, dismantling of the meter. If it is still impossible to come up to this standard, then the meter should be replaced.

Replacement or repair of meters

New meters have to be tested during milking, after which the water test should be carried out twice.

Reporting the results

The results of the periodic checking of the milk meters, as well as interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milk recording organization.

Sampling equipment

Check the sampling equipment for cleanness and parts.

LACTOCORDER BY WMB AG

A.1.1 General information

CAUTION The routine inspection with water must be carried out on perfectly clean devices.
CAUTION In order to avoid remains of dried test fluid, the devices must be cleaned after the test by means of a normal alkaline CIP-cleaning (Cleaning in Place).

Reference value

The LactoCorder milk yield measuring device's reference value is established by dividing the value read from the display by a correction factor. This correction factor takes account of the difference between the specific weight, the viscosity of the milk as well as its foaming characteristics and the test fluid. In all firmware versions until 063xxxx measured with Florin S Plus this correction factor is 1.000 which means that no correction is necessary. From version 06403xx, which has integrated the measurement of goats, the correction factor is 1.014. However, by measuring with Neoagrar Top S the correction factor is for all firmware versions 1.000. The results of earlier inspections are available for use during periodic inspections.

Required equipment

- Vacuum pump with negative pressure of 40 to 50 kPa
- Hoses with a 14-16mm internal diameter
- Flow reducer (Flow ca 5.5 kg/min), art.2506 (supplier: WMB AG)
- Intermediate piece with air inlet, art. 2505 (supplier: WMB AG)
- Calibrated electronic scales
- A bucket with a volume of at least 15 litres
- A milking pail for receiving the test fluid
- Thermometer

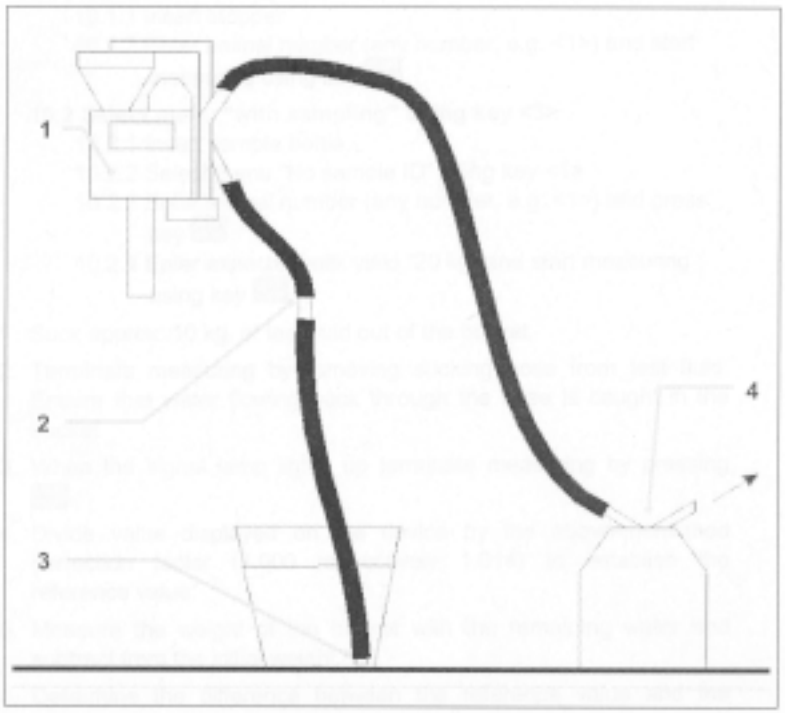
Test fluid

Florin S Plus

- Water with a temperature of 20 °C +/- 5 °C
- Addition of
  - 2% (volume-%) Florin S Plus, art.2685 (supplier: WMB AG)
  - 0.1% ANTIFOAM Y30 EMULSION, art.1290 (supplier: WMB AG)
- Mix test fluid well. The test fluid may be used for 50 measurements and one day only.

Neoagrar Top S

- Water with a temperature of 20 °C +/- 5 °C
- Addition of 0.3% (volume-%) Neoagrar Top S, art.15566 (supplier: WMB AG)
- Mix test fluid well. The test fluid may be used for 50 measurements and one day only.



1 *Secure LactoCorder at a height of approx. 1.5 metres (untilted)*
2 *Art.2505 Intermediate piece with air inlet*
3 *Art.2506 Flow reducer*
4 *Connection vacuum 40 to 50 kPa*

Test procedure

1. Have the bucket with approximately 15 litres of test fluid ready and calculate its exact weight
2. Switch on the LactoCorder using the ON OFF key
3. From version 06403 for species select "cows"
   - In the main menu <5> continue
   - Service <6>
   - Adjustments I <2>
   - Continue <E>
   - Species <6> (select cows <1>)

4. Shift further in the main menu with key <5>
5. Select the menu " Measuring without OD" using key <7>
6. Confirm correct position (i.e. "Milking") of the two rinse levers using the key requested by the device <x> (random number)
7. Enter herd number (any number, e.g. <1>)
8. Enter milking position (any number)
9. Select menu "with signal lamp" using key <1>
10. Measuring with or without sampling (variant 10.1 or 10.2)

10.1 Select menu "without sampling" using key <1>

10.1.1 Insert stopper

10.1.2 Enter animal number (any number, e.g. <1>) and start measuring using key START STOP

10.2 Select menu "with sampling" using key <3>

10.2.1 Insert sample bottle

10.2.2 Select menu "No sample ID" using key <1>

10.2.3 Enter animal number (any number, e.g. <1>) and press key START STOP

10.2.4 Enter expected milk yield "20 kg" and start measuring using key START STOP

11. Suck approx. 10 kg. of test fluid out of the bucket
12. Terminate measuring by removing sucking hose from test fluid. Ensure that water flowing back through the hose is caught in the bucket
13. When the signal lamp lights up terminate measuring by pressing START STOP
14. Divide value displayed on the device by the above-mentioned correction factor (1.000 respectively 1.014) to establish the reference value.
15. Measure the weight of the bucket with the remaining water and subtract from the initial weight.
16. Determine the difference between the reference value and the effective quantity of water drawn through.
17. Cleaning the devices with an alkaline detergent and properly rinsing it afterwards with clean water.

Analysis of sample volume

- The reference value for the sample volume must be between 33 and 38 g.
- If the result of measurement lies within the range of the reference value, the device is cleaned with clear water while also rinsing through the split-off valve by means of the valve test (see separate instruction: cleaning monitoring).
- If the result of measurement lies outside the range of the reference value the following fault could be present:
  - The sampling valve has not been cleaned properly.
  - The concertina seal for ventilating air during sampling is missing.

LELY MWS

Annual routine procedure Lely Milk Weighing System (MWS)

Annual test as proposed by the manufacturer.

To test the Lely Milk Weigh System (MWS) the following procedure needs to be performed:

- If the milk jar is dirty, perform a local rinse.
- Take the robot out of operation.
- Make sure all water is drained from the MWS
- There are 2 ways to create a reference weight
- Go to Test>>Test menu>>milk meter (Figure 1)

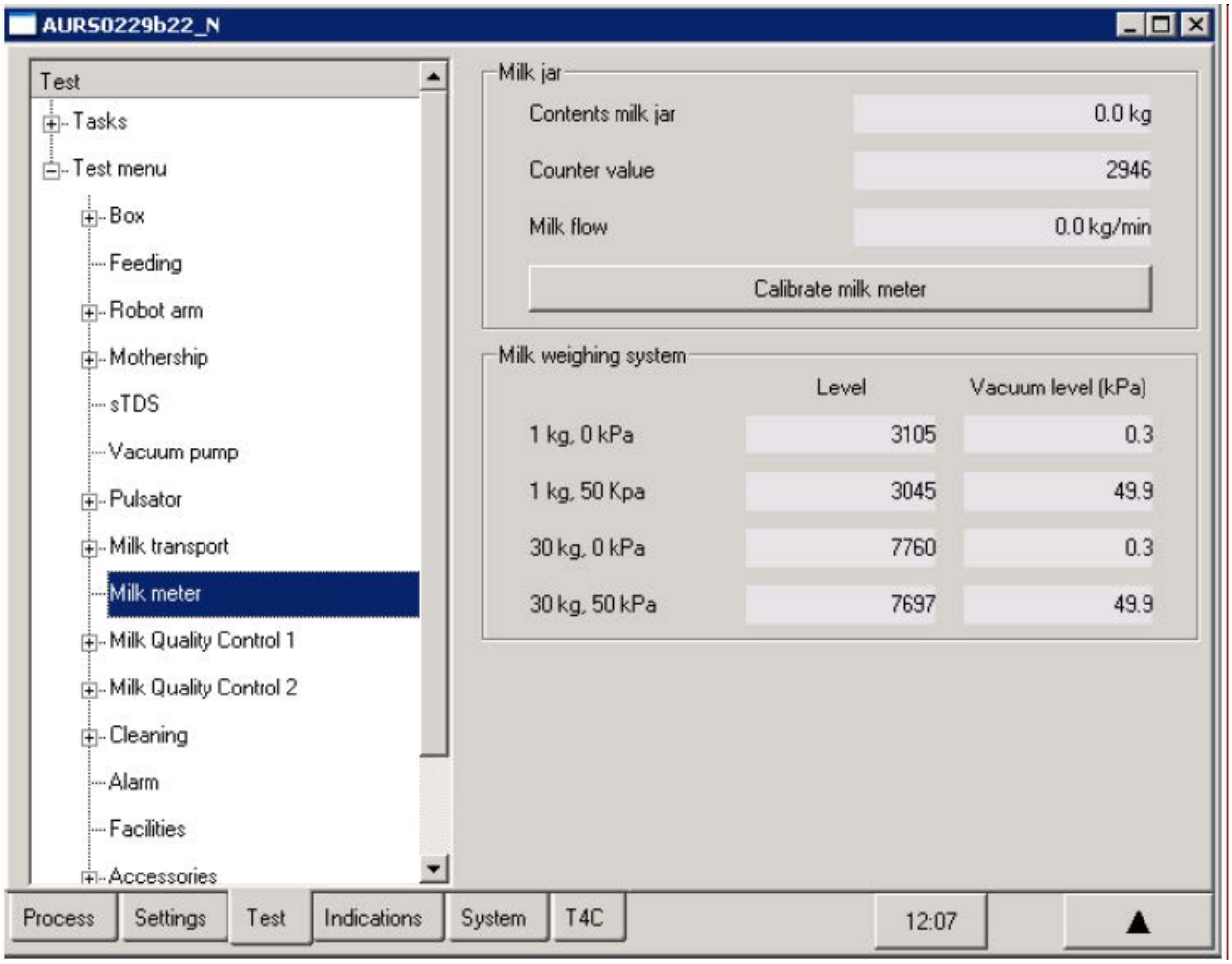


Figure 1.

Press Calibrate milk meter (Figure 2)

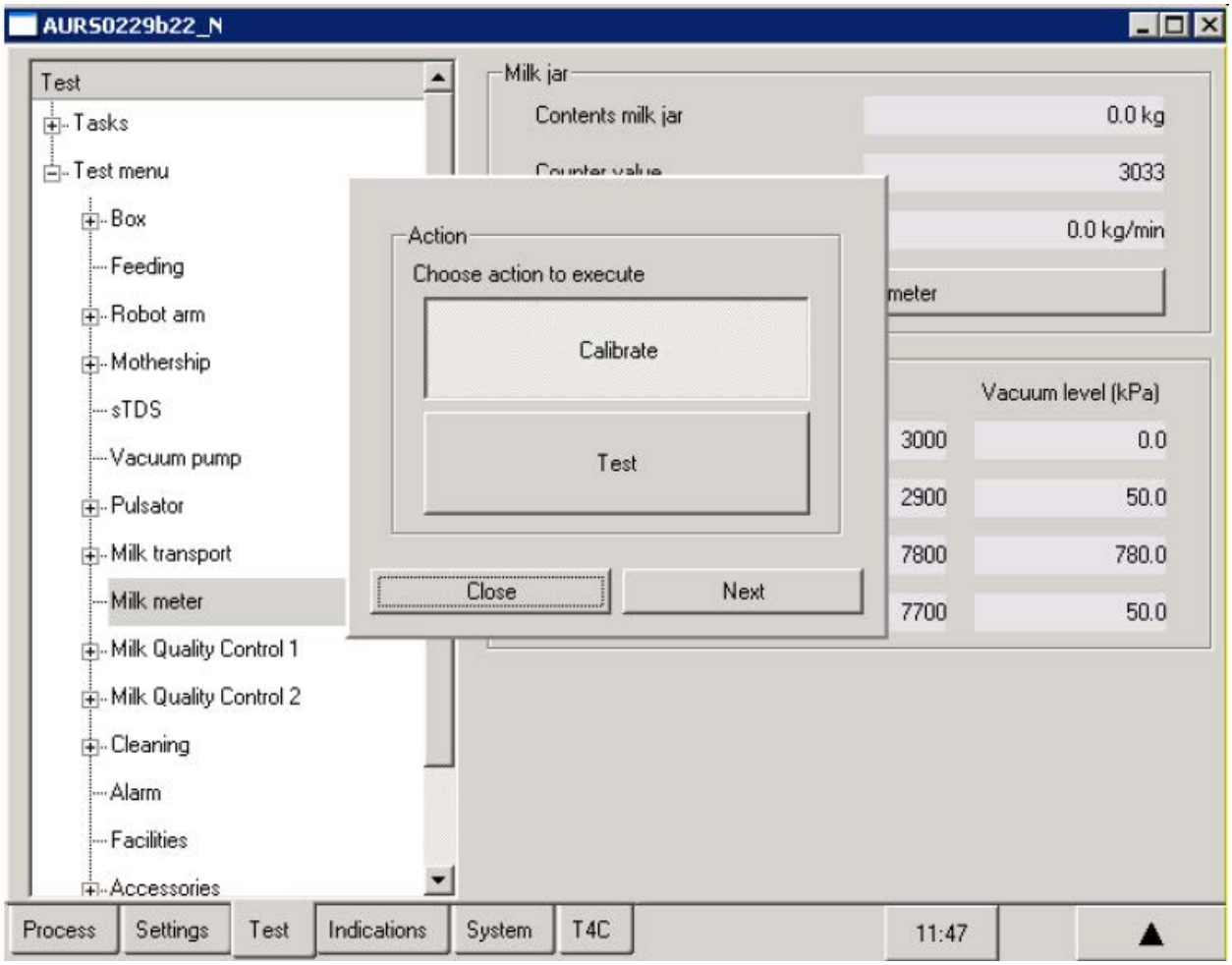


Figure 2.

Press next (Figure 3)

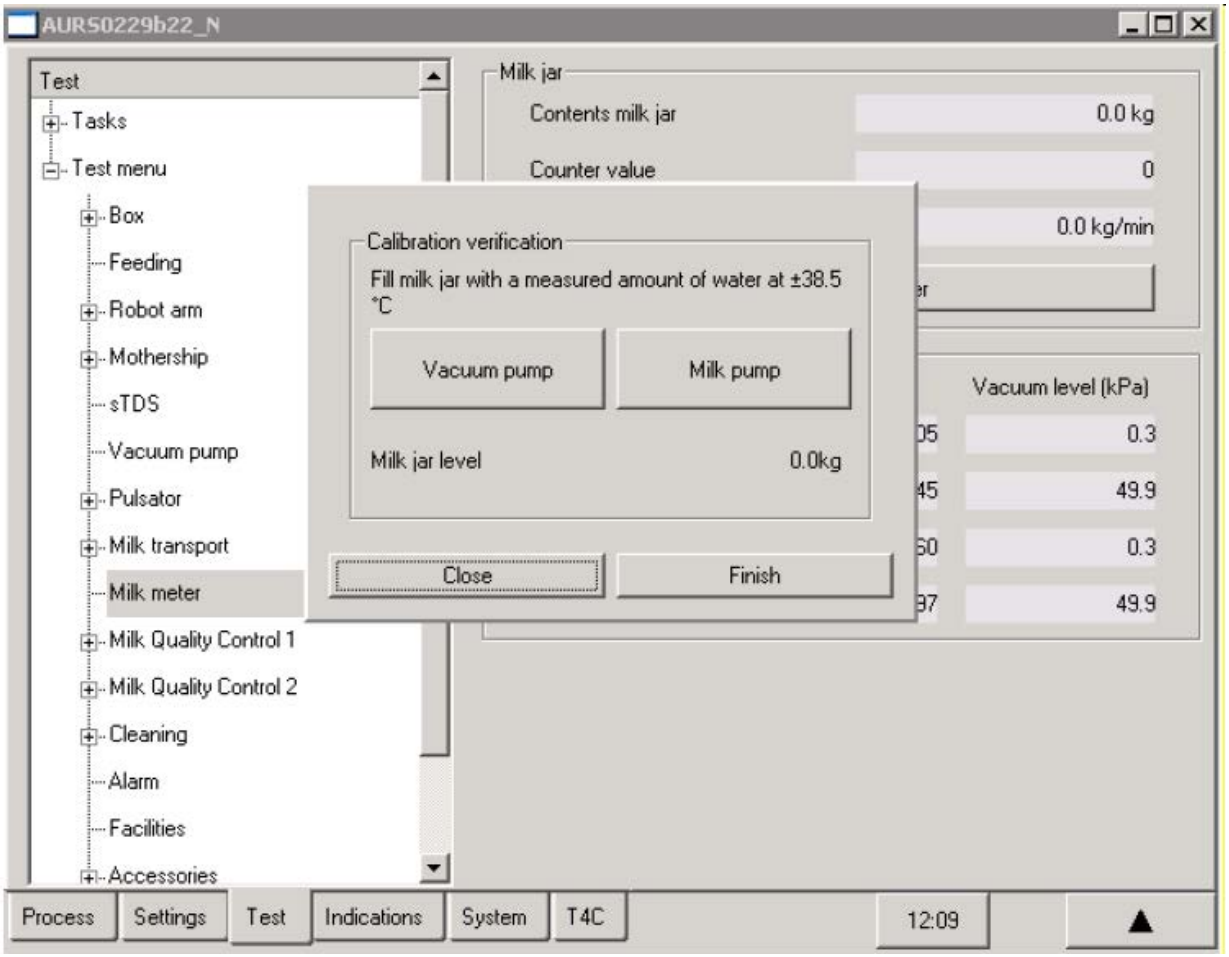


Figure 3.

There are 2 options to test the MWS:

1. Fill the milk jar with 10,0 kg water of 38.5°C +// 1.5°C, by sucking (press Vacuum pump) this in through a milk tube. During filling the counter value should increase, if it doesn't there is a mechanical/ hardware issue.

or

2. Use four calibrated weights of 2,5 kg to hang at the bottom of the MWS in the predetermined holes (Figure 4)

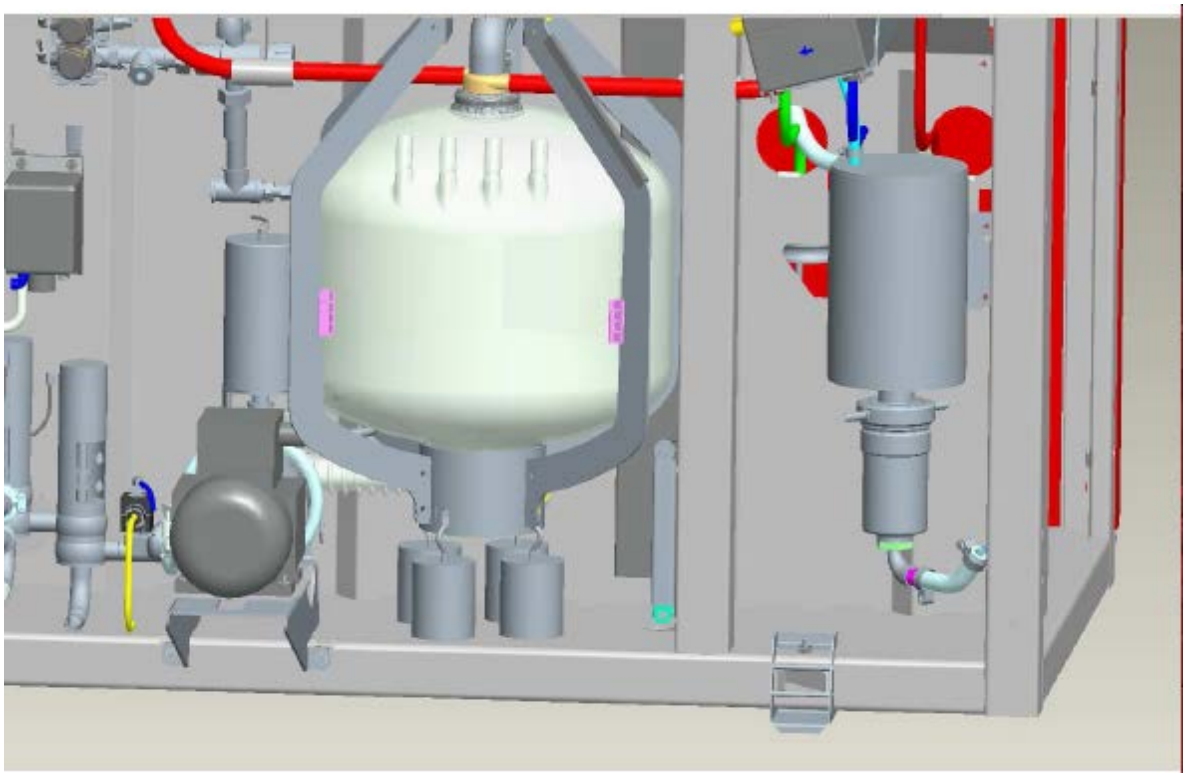


Figure 4.

Read out the milk jar weight. The measured weight should lie between 9,8 and 10,2kg (Figure 5). Press finish.

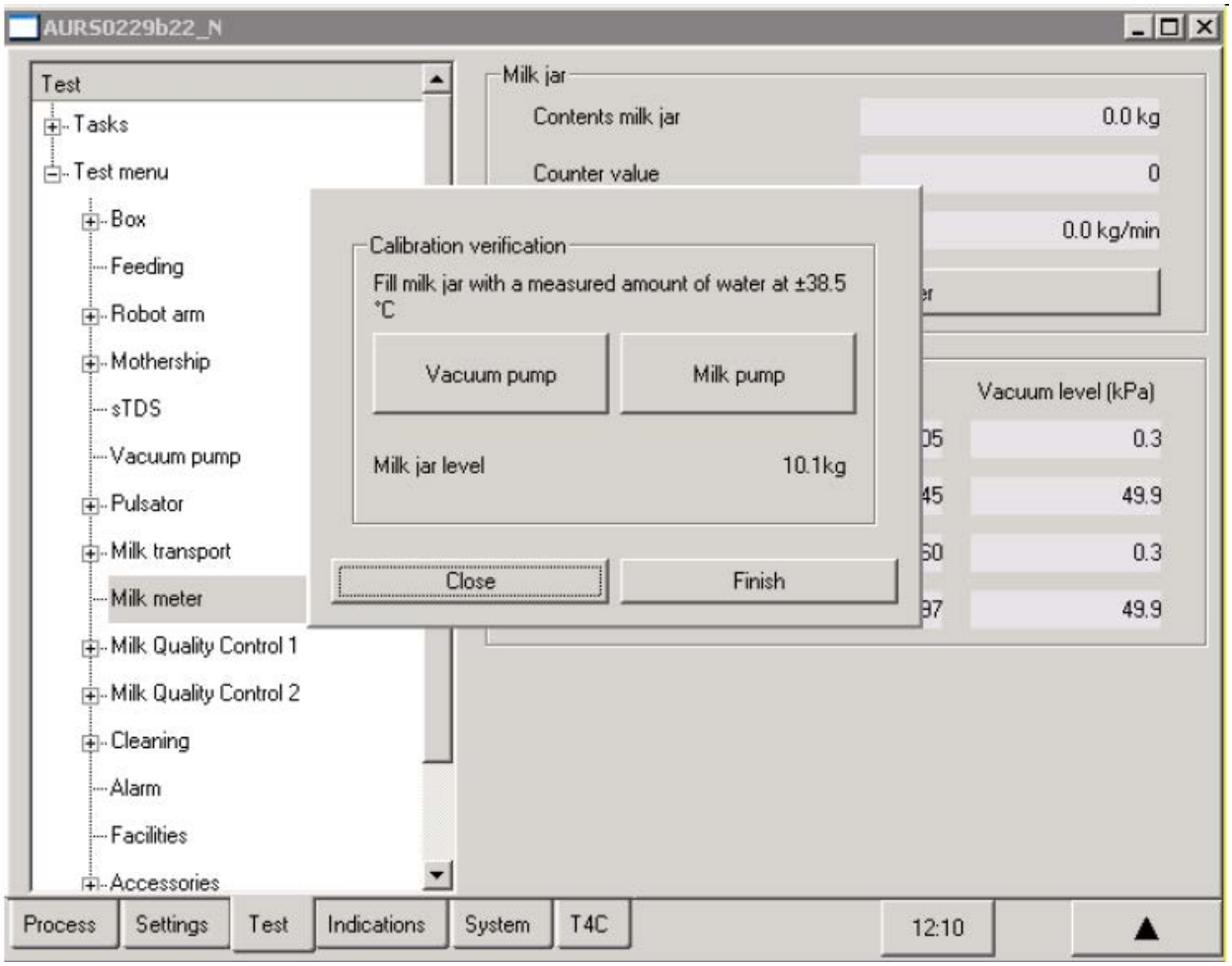


Figure 5.

- The concertina seal is damaged.
- The sampling bottle is damaged in the area of the mounting throat and is not sealing or is otherwise leaky.
- The O-ring on the bottle holder is damaged.
- There is an air gap between the bottle holder and the sampling mount.
- A crack in the housing of the sampling mount.

If all such error sources have been excluded the "Correction sample amount" must be checked and adjusted as necessary (factory-adjusted).

1. Shift to another menu point in the main menu by pressing the <5> key
2. Select key <6> in the 'Service' menu
3. Select key <2> in the 'Settings' menu
4. Select the menu 'Correct sample size' with the <3> key, enter the difference and confirm by pressing the <Enter> key.
5. Select the menu 'Back' using the <Clear> key 3 times until one arrives back in the main menu and continue the test procedure.

Please send the device to the Service Centre to be checked if the result of measurement still cannot be brought to match the reference value even after entering a correction value.

Analysis of measurement results (in accordance with Dr. D. Nosal)

- The device is functioning correctly if the difference between the first measuring results is a value less than 0.1 kg.
- A second measuring should be carried out if the difference for the first measuring is greater than 0.1 kg.
- The device is functioning correctly if the average difference between both measuring results is a value less than 0.2 kg.
- A third and fourth measuring must be carried out if the difference is greater than 0.2 kg.
- Measuring should be repeated if the limit value cannot be maintained. First check the device for damage or incorrect assembly.
- If the limit value still cannot be maintained the device should be subjected to alternating acidic/alkaline cleaning. (The test fluid has different moistening characteristics to milk which means that contamination of the device during the water test will probably become more marked than for milk measuring).

- The MPKF factors should be reloaded if necessary, as they can be slightly altered by water measuring with dirty devices. (Measuring in milk would, however, lead to rapid automatic normalisation of these factors).
- If the limit values still cannot be maintained the device should be sent to the manufacturer for inspection.

LEVEL MILK METER (NEDAP)

Frequency of periodic checking at least once in 12 months.

General

- The testing procedure with water should be carried out with milk meters that are cleaned properly.
- First, flush the jars with water with a temperature of ± 40 C.

Reference value

For all "Nedap Nivo" milk meters a fixed standard is used (9.8 - 10.2 kgs) instead of a "reference value". More-over, when proceeding to periodic checking, results of former checks are handed over for support.

Required equipment

- No specific sucking set.
- For sucking up the water, a milk tube is used. Sometimes, depending on the inflowing milk in the jar, a narrowing (restriction) is placed in the milk tube.
- Electronic weigh-beam/bascule.
- Some buckets of sufficient capacity.
- Thermometer.

Testing liquid

- Water with a temperature of 38.5 C +/- 1.5 C.
- No addition of salt or acids.

The principle of the test

- Suck 9.7 kg of testing liquid.
- Read the display value.
- The display value has to be between 9.8 and 10.2 kg (10.0 kg +/- 0.2 kg).

Quality of the observations/measuring

- If the result of the first measuring lies in the area between 9.9 and 10.1 kg: meter = correct. If the first measuring gives a value of 9.8 or 10.2 kg, a second measuring should be carried out.
- If both measuring give values that lie in the area between 9.8 and 10.2 kg: meter = correct.
- The difference between duplicate mea-suring should not be bigger than 0.1 kg.

Deviating meters

The deviating meters are subjected to a visual check and where possible simple faults are rectified.

After this check, two measuring per meter are carried out. If the values that are found lie between 9.8 kg and 10.2, the meters are accepted. Of course, the duplicate values may not differ more than 0.1 kg.

Replacement or repair of meters

Meters that do not come up to the stan-dard of 9.8 - 10.2 kgs should be corrected or replaced.

When meters are replaced or when repairs influence the measuring, the meters are to be tested during the milking, after which the testing procedure with water should be carried out twice.

Reporting the results

The results of the periodic checking of the milk meters, as well as interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milk recording organization.

Sampling equipment

- Check the sampling equipment for cleanness and parts.
- See to it that the sampling equipment is stored in a dry place, free from dust.
- Avoid direct sunlight.

MANUFLOW 2 MILK METER

Frequency of periodic checking at least once in 6 months.

General

The testing procedure with water should be carried out with milk meters that are cleaned properly.

Reference value

The reference value ("test" value) of the Manuflow 2 milk meter is the value in the Service Program calculated by software in connection with calibration.

The "Test" value is the average amount of water in grams measured by the milk meter per each "dump" during water test.

This value is however not used during the test. A standard deviation of +- 0.2 kg between display-value and measured water passed through the meter is used. When proceeding to periodic checking, results from former checks will be handed over for support.

Required equipment

- A Manus test set, consisting of:
  - Calibrated test pipe for a flow rate of 3.5 kg/min +- 0.4 kg/min at 42 kPa
  - Air bleed of 6 l/min.
- Electronic scale indicating every 10 grams
- Clamp to stop the water flow
- Bucket for water, of sufficient capacity, approx. 15 liters.
- Milk bucket including a lid with proper hose connection
- Tube to connect milk meter to milk bucket. Should be the same as the normally used tube; 19 mm internal diameter, max. length 650 mm.

Testing liquid

- Normal tap water, no specific temperature and no additional salt or acid.

The principle of the test

Before you start the water test, please check: water flow rate is 3.5 kg/min (+- 0.4 kg/min) at 42 kPa vacuum level. The milk bucket and milk meter must be completely empty.

- Open all gates (gate switch closed)
- Press: "Cow-data-key" - F-key
  "Cow-cal.-key" - F-key
  "Temp-data-key" - F-key
  the display will show "TEST00.00"

- Suck up approximately 10 liters of water
- Stop the water test when the display shows ~ 10 kg
- Measure the water which passed through the meter and compare it with the value of the display. The values should be within +- 200 grams. Repeat the procedure two times.

When within the limit, the water test is o.k. If not, make a calibration.

Quality of the observations/measuring

- If the first measuring value deviates +/- 0.1 kg from the reference value: meter = correct.
- If the first measuring value deviates more than 0.1 kg from the reference value, proceed to a second measuring.
- If duplicate measuring have an average deviation of ≤ +/- 0.2 kg from the reference value:
- meter = correct.
- Difference duplo´s ≤ 0.1 kg.

Deviating meters

When the measuring do not come up to this standard, the meter should be recalibrated and after that a new water test should be made. If it is still impossible to meet the standard, the meter needs service.

Replacement or repair of meters

When meters are replaced or when repairs influence the measuring, the meters should be calibrated. After calibration the good performance should be verified with a new water test.

Reporting of the results

The results of the periodic checking of the milk meters, as well as the interim changes and the checks that go with these changes will be reported to those concerned, the farmer, the main supplier and to the national milk recording organization.

Sampling equipment

- Check the sampling equipment for cleanness and parts.
- See to it that the sampling equipment is stored in a dry place, free from dust.

Hints for the sample taker and the farmer for correct sampling by means of Manuflow 2

Before sampling

- make sure that the air inlet in the milk claw and milk meter is opened;
- disinfect the sample equipment in a cleaning solution;
- remove the rubber plug from the sampler ring;

- attach the sampler to the meter (see pic-ture);
- connect vacuum supply to the sample taker;
- make sure that all equipment for sampling contains no water residues.

Taking the sample

- the display of the meter should always be at zero when the milking is started;
- after manual or auto-take off read the display and remove the sample bottle and replace it with a new one;
- transfuse the sample three times by means of a mixture -bowl and take at once the sample;
- place the empty sample bottle upside down to drain off.

After sampling

- remove the sample equipment and disassemble the sampler adapter and clean all pieces carefully by hand in a cleansing- and disinfecting solution;
- store the sampling equip-ment in a dry and dust free place;

Farmer, do rinse your equipment with acids on a regular basis!

MDS SACCOMATIC IDC 3

Installation and periodic calibration

Installation and periodic calibration

Calibration and test of IDC

To ensure that the values registered by the IDC milk meter are correct, the milk meter must be calibrated and tested after installation. To ensure the accuracy of this calibration, the plant must have run in a normal milking routine for at least one week before performing the calibration.

- IDC1: No calibration of this unit. IDC2, IDC-T: Only water calibration.
- IDC3: Both water calibration and milk calibration.
- IDC2 for sheep and goats: carried out like IDC2 for cows except from a change in the water amounts that run through the IDC during calibration.

Installation test

Installation test can be performed 1 week after the plant has started normal milking routine, at the earliest. The test is performed by the fitter in the following way.

The milking system is washed immediately before the test. Wash must contain the following elements:

- Wash with base, which must have a start temperature of min. 75°C and end temperature must exceed 42°C.
- Wash with acid.
- If lime scale or other sediments are visible after wash perform an additional hot acid wash with a start temperature of min. 70°C.

The plant must be entirely clean and free of sediments before starting calibration!!

Check that the IDC's are hanging horizontally within a tolerance of ±20 and that the measuring cups are correctly fitted and not twisted in relation to the fitting tap.

When calibrating one or more milk meters it is important that the milk meters that should not be calibrated are not serviced.

The calibration fluid is mixed according to the following table

L mixed fluid	10 liter	15 liter	20 liter
Household salt (NaCl)	30 gram	45 gram	60 gram
Calibration fluid (12187)	5 ml	8 ml	11 ml
Washer rinse (12190)	13 ml	20 ml	27 ml

Mixing procedure

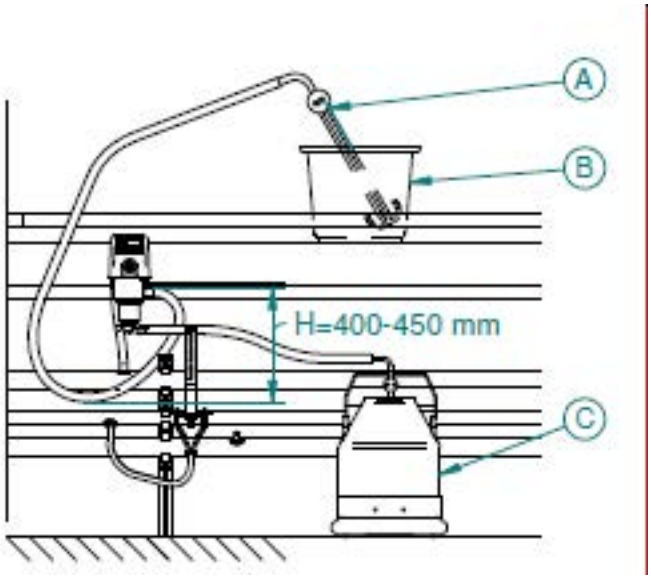
1. Dissolve NaCl in 1L of hot water with a temperature above 50°C.
2. Add calibration fluid and washer rinse.
3. Stir the mixture until salt is dissolved.
4. Add cold water to reach the desired volume and stir again.

When using the fluid for calibration it must have a temperature between 15 and 30°C.

Mixture must be recycled for calibration of same measurements. Same mixture can also be used for calibration of several meters. The mixture can be used for an entire day, after which a new mixture must be made. The scales in use must have an accuracy of ± 0.02 kg.

Flowmeter (900 71.000) equipped with 3.85 mm nozzle (12189) that gives 3L/min at 38 kPa at high flow and a 1.5 mm nozzle (12188) that gives 1l/min at 38 kPa at low flow.

For sheep and goats, the nozzles are respectively 400 g/min: 271 00.111 and 1000 g/min: 12188 Airflow through the flow meter must be 6-8 l/min.



Calibration setup

Remove the milk hose from the milking cluster and replace it with the flow meter (A). It is important that the hose is guided from flow meter to IDC as usual as displayed on page H42 60.074GB. Now the water is lead to a milking bucket (C) from the bottom of the IDC instead of through the milk line. It is important that the hose has a drop from the IDC to the milk bucket for the water to primarily run through and not be pushed through by air. A bucket (B) with water from which the flow meter sucks water is set where the cow would normally stand.

If necessary the milking bucket can be equipped with "Bottom piece, closed" (210 46.303) so that mounting of a pulsator is not needed.

Before choosing the calibration setting on the power supply it is important that all IDCs are in milking mode and not milking.

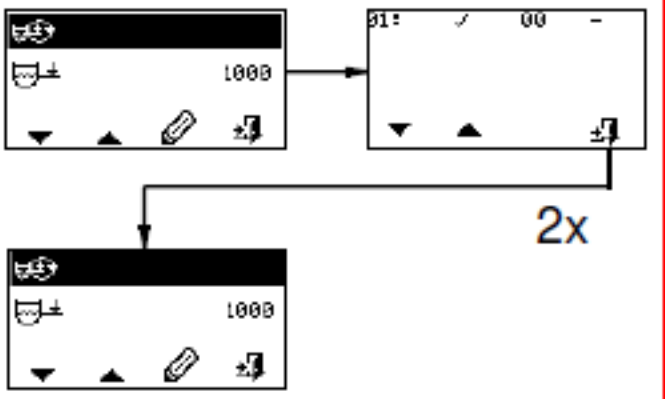
Choose the calibration menu from the configuration menu. Access to the configuration menu is described elsewhere in this service manual. After choosing calibration menu an overview is displayed of the state of all IDCs. Power supply must be in this menu item as long as calibration is in process.

Furthermore, all IDCs have changed displays image to calibration image and the display reads 4.00.

System is now ready for calibration of individual IDCs. This process is described on following pages.

When calibration of individual IDCs is done press "leave menu" button. All IDCs now leave calibration mode. Screen image on power supply is updated with the new state of the IDCs. Press "Leave menu" again and the IDCs return to the calibration menu.

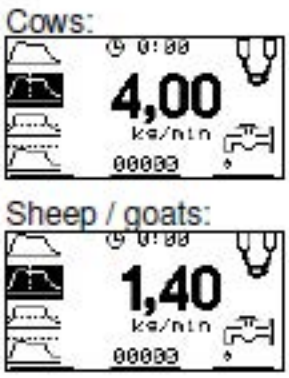
If the entire calibration is not done, it is possible to leave the calibration menu after calibrating a number of IDCs and begin normal milking. Remaining IDCs can be calibrated later by returning the entire system to calibration menu.



The rest of the calibration routine takes place on the IDCs that have changed to the screen image in step 1 – item 1. At the same time the diode flashes between green and red, when water is not sucked through the IDCs.

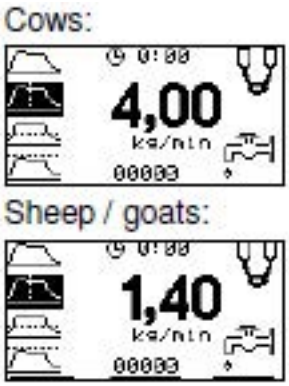
Water calibration step 1 - 4kg/min (Sheep/goats 1,4 kg/min)

1



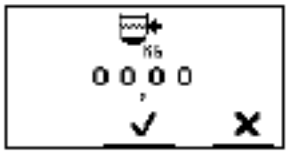
The flow meter is set to suck through the large and the small nozzle at the same time (the flow meter will now suck 4 l/min (cows) or 1.4 l/min (sheep/goats)). Press start and the IDC will suck up water. After about 15 seconds start is pressed again so the IDC stops. This is done to change the amount of water in the IDC, and change the hoses to a high flow.

2



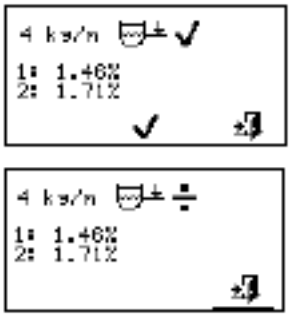
Empty the milk bucket on the floor and ensure that there is enough water in the bucket standing in the cows place to go through this item. Press the start button and the IDCs will suck up water from the bucket. The IDC stops automatically, when desired amount has been sucked and screen image changes to the one displayed in item 3.

3



Weigh the amount of water (kg) in the milk bucket and enter the weight into the IDC. It is important that it is the water that has been passed through the IDC that is weighed and NOT the weight difference of the bucket the water has been sucked from. Press ✓ when the desired amount has been entered in the IDC. By pressing X the marker returns to start. After successful entry the display image changes to the one in item 4.

4



One of the following screen images appear. Top one appears when this part of the calibration is successful and all items on the screen have been marked by a percentage. As displayed a ✓ appears above the center button. Press this to continue to the next calibration step. IDC now shifts to step 2 item 1.

The bottom screen image appears if this part of the calibration is inaccurate and must be repeated or enough measurements have not been made. As displayed there is no ✓ above the center button. Furthermore there is a ÷ on top of the screen. It is only possible to leave the menu, which brings the IDC back to item 2.

Water calibration step 2 - 1kg/min (Sheep/goats 0,4 kg/min)

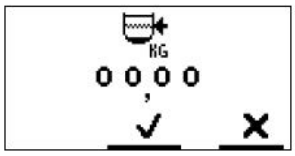
1

Set flow meter to only suck through the small nozzle (flow meter will now suck 1 l/min (cows) or 0.4 l/min (sheep/goats). Press "Start" and the IDC start sucking water. Press "Start" again after app. 15 seconds to stop IDC. This is done to alter the amount of water in the IDC and hoses to low flow.

2

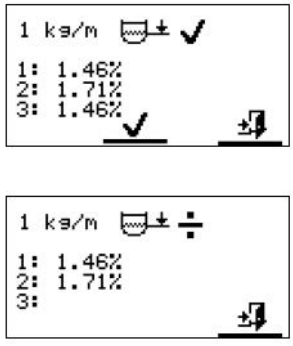
Empty the milking bucket on the floor and ensure that there is enough water in the bucket on the cow's place to complete this item. Press "Start" on the IDC and it starts sucking water from the bucket. IDC stops automatically when desired amount has been sucked and screen image changes to the one displayed under item 3.

3



Weigh the amount of water (kg) in the milk bucket and enter the weight into the IDC. It is important that it is the water that has passed through the IDC that is weighed and NOT the weight difference of the bucket that water is sucked from. Press ✓ when the desired amount has been entered in the IDC. By pressing X the marker returns to start. After successful entry the display image changes to the one in item 4.

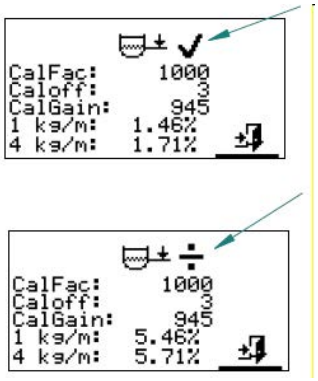
4



One of the following screen images appear. Top one appears when this part of the calibration is successful and all items on the screen have been marked by a percentage. As displayed a ✓ appears above the center button. Press this to continue to the next calibration step. IDC now shifts to step 3 item 1. The bottom screen image appears if this part of the calibration is inaccurate and must be repeated or enough measurements have not been made. As displayed there is no ✓ above the center button. Furthermore there is a ÷ on top of the screen. It is only possible to leave the menu, which brings the IDC back to item 2.

Water calibration step 3 – completion

1



IDC now displays a screen image holding the different calibration values. Furthermore, either a ✓ is displayed, if IDC is fully calibrated, or ÷ if routine must be repeated. Go back to step 1 item 1 if routine must be repeated and repeat calibration.

Routine must be repeated until ✓ appears after which calibration is complete.

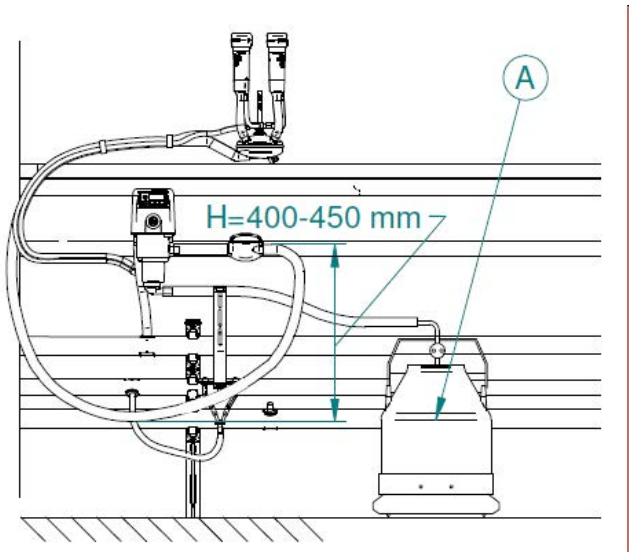
Write down calibration values when ✓ appears not before. If there are interruptions that interfere with completion of the calibration, calibration must be started over.

When pressing "Leave menu" the user is returned to screen image in step 1 item 1 and a new calibration can be started. This applies whether calibration is successful or must be repeated.

Exit from calibration mode can be done from power supply as described on page H42 60.070GB.

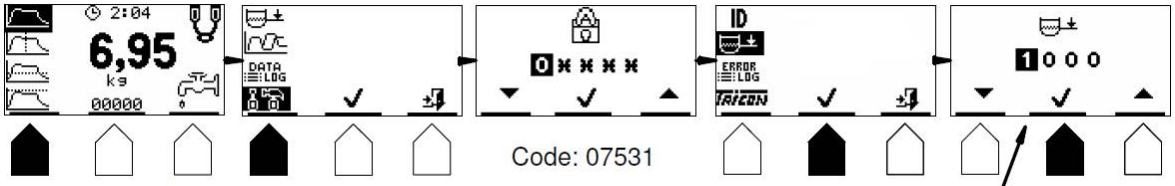
Milk calibration control – IDC 3

After completed water calibration of IDCs they must be controlled and adjusted during milking. This is done by control weighing a series of milkings, calculate their calibration value and then enter this value in the IDC. This must be done for all IDCs individually.



Calibration setup

The milk is now lead from the bottom of the IDC to a milking bucket (A) instead of in milk hose. It is important that the hose has a drop from milk line to IDC for milk to primarily runs and is not pushed through by air.



Before the first check is carried out, it is important to ensure that there is milk in the IDC and cluster, otherwise an error measuring may occur which can influence the final calibration result negatively

Milk calibration manual / spreadsheet

Milk calibration can be done by using the attached table including instructions or by downloading the calibration spreadsheet from SAC's internal network, which is developed especially for this purpose. Instructions on this procedure are attached to this manual.

Measuring cup replacement (11419) or IDC print (11376)

If a measuring cup or IDC print is replaced both a water and milk calibration must b e performed on the relevant IDC to uphold ICAR-approval.

Procedure for milk check

The columns are filled according to following formula in the table on the next page: Remember to fill in signs.

Column 1: The amount visible in the IDC display when milking is completed.

Column 2: The amount weighed in the bucket.

Column 3: Column 1 - column 2.

Column 4: Column 3 * 100.

Column 5: Column 4/Column 2.

Field 6: The largest difference between 2 numbers in column 5 (largest number - smallest number).

Check: If the number in field 6 is smaller than -5 or larger than 5, milk calibration must be started over with 3 new measurements in a new table. Otherwise skip to field 7.

Field 7: Sum of all numbers in column 1.

Field 8: Sum of all numbers in column 2.

Field 9: Field 8/Field 7.

Field 10: Current calibration factor in IDC * Field 9.

Field 11: New calibration factor to be entered in IDC, instead of one already there.

Calibration completed.

Following is an example of a completed table. Calculation is based on IDC with an existing calibration value of 980.

If the meter is not able to calibrate within ±5 in field 6 after several attempts, the measuring housing is changed and entire calibration procedure must be started over with water calibrating the IDC.

In order to use the milking for calibration, more than 4.5 kg of milk in one milking is needed.

Milking No	Column 1	Column 2	Column 3	Column 4	Column 5
1	11,4	11,2	0,2	20	1,79
2	13,2	13,5	-0,3	-30	-2,22
3	15,8	16	-0,2	-20	-1,25
Field 7:	40,40			Field 6:	3,04
	Field 8:	40,70			
	Field 9:	1,01		Field 10:	987

Table for calculation of control milkings - Performed on:________________

Meter No	Milking No	Column 1	Column 2	Column 3	Column 4	Column 5
	1					
	2					
	3					
	Field 7:				Field 6:	
		Field 8:				
		Field 9:			Field 10:	

Meter No	Milking No	Column 1	Column 2	Column 3	Column 4	Column 5
	1					
	2					
	3					
	Field 7:				Field 6:	
		Field 8:				
		Field 9:			Field 10:	

Meter No	Milking No	Column 1	Column 2	Column 3	Column 4	Column 5
	1					
	2					
	3					
	Field 7:				Field 6:	
		Field 8:				
		Field 9:			Field 10:	

Meter No	Milking No	Column 1	Column 2	Column 3	Column 4	Column 5
	1					
	2					
	3					
	Field 7:				Field 6:	
		Field 8:				
		Field 9:			Field 10:	

Meter No	Milking No	Column 1	Column 2	Column 3	Column 4	Column 5
	1					
	2					
	3					
	Field 7:				Field 6:	
		Field 8:				
		Field 9:			Field 10:	

Meter No	Milking No	Column 1	Column 2	Column 3	Column 4	Column 5
	1					
	2					
	3					
	Field 7:				Field 6:	
		Field 8:				
		Field 9:			Field 10:	

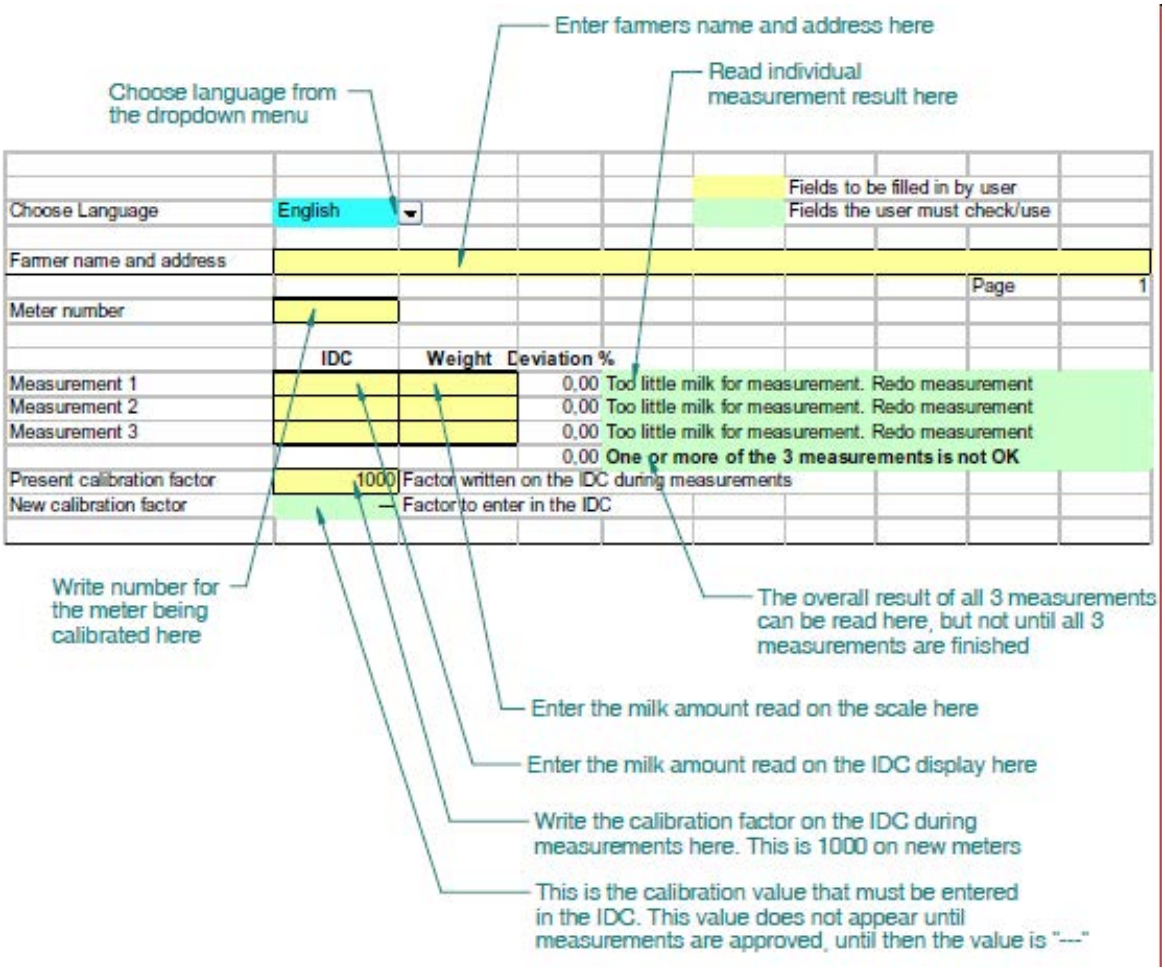
Milk calibration procedure for IDC 3 using spreadsheet

As replacement for the manual schedule the milk calibration can now be done by using the spreadsheet below, which can be found on SAC's internal network through the following link:

http://intranet.sac.dk/getfile.php?objectid=27891

or through this path: Technical Dept. -> Fitter tools -> IDC

The spreadsheet is filled in as described below:



It is important that all measurements are written in their own area of the spreadsheet as all measurements must be sent to one of the offices below to achieve ICAR approval.

After finished calibration send the calibration sheet as described below:

Send to:	The Local Milk control Authorities	Applies to all countries except Denmark
Send to:	S.A. Christensen & Co Ndr. Havnevej 2 DK – 6000 Kolding Att.: Service Department	Applies to Denmark
	or	
Email:	milkcontrol@sac.dk	Applies to Denmark

Annual control to uphold ICAR approval

To uphold ICAR approval on the milk meter it must be controlled annually. This is done by completing a milk sample as described in this manual in the paragraph "Calibration with milk - IDC 3" (page H42 60.074GB).

Only 1 measurement is necessary.

If the total milk amount in the bucket is below 8 kg the measurement is invalid and a new must be made.

The measurement must be carried out when the IDC operates in normal milking with normal removal procedure. During the annual check, the IDC must not operate in forced milking as this may cause a misleading result.

If the total milk amount in the bucket is between 8 and 10 kg the IDC display must show the same amount +/-0.5 kg for the measurement to be valid.

Example: Scale displays 8.5 kg and IDC displays 8.35 kg - this measurement is valid, as 8.35 kg is within the interval of 8.00 and 9.00 kg which is allowed.

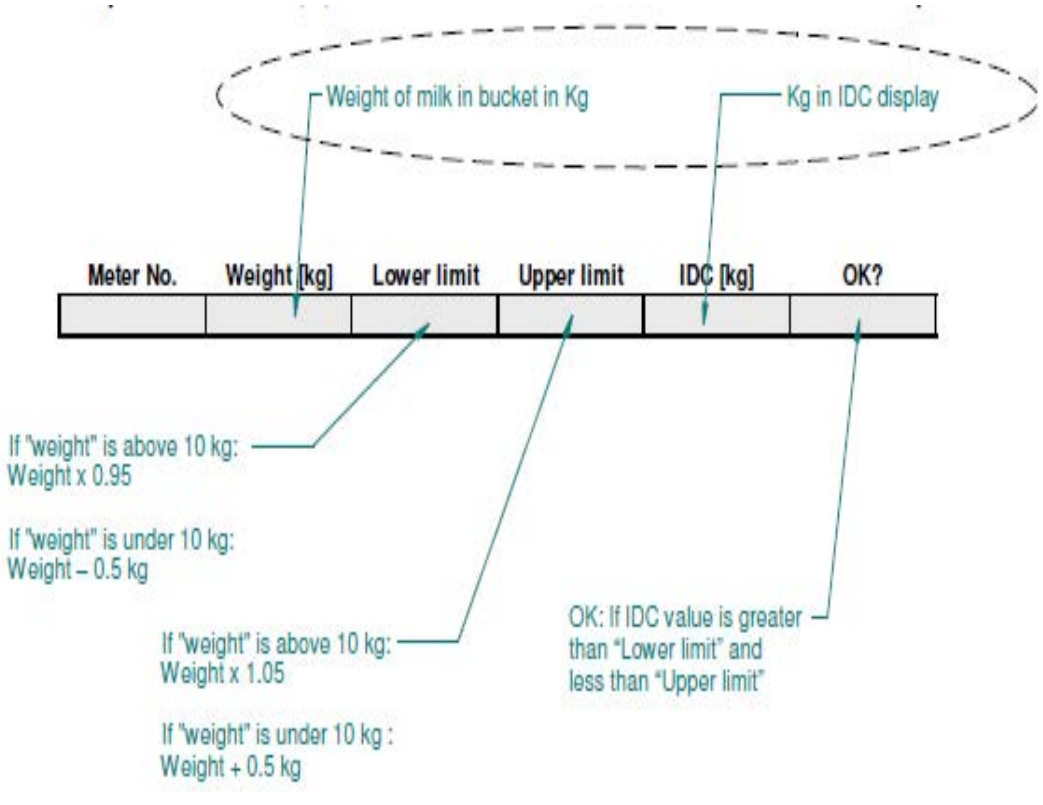
If the total milk amount in the bucket is more than 10 kg the IDC display must show the same amount +/- 5% for the measurement to be valid.

Example: Scale displays 15.8 kg and IDC displays 16.02 kg - this measurement is approved as it is within the interval of ± 5 %, which is 15.8x0.95 = **15.01** kg and 15.8x1.05 = **16.59** kg

If the IDC does not comply with the requirements for ICAR approval a new milk calibration must be done as described on page H42 60.074GB in this manual. For this calibration measurement used for validation can be entered as measurement number 1.

After milk calibration the IDC is approved for another year's operation.

In the spreadsheet edition it is only the two cells in the circle that must be filled in, as the rest are automatically calculated. In the paper version all fields must be calculated and filled in manually.



The electronic version can be downloaded through this path: Technical Dept. -> Fitter tools -> IDC
The direct link is: http://intranet.sac.dk/getfile.php?objectid=27890

Name:

Address:

Spreadsheet for calculating control milkings - Date:

Meter No.	Weight [kg]	Low interval	High interval	IDC [kg]	OK?

After finished calibration send the calibration sheet as described below:

Send to:	The Local Milkcontrol Authorities	(applies to all countries except Denmark)
Send to:	S.A. Christensen & Co Ndr. Havnevej 2 DK – 6000 Kolding Att.: Service Department	(applies to Denmark) or
Email:	milkcontrol@sac.dk	(applies to Denmark)

MELTEC MILK METER, also called MEMOLAC 2

Frequence of periodic checking at least once in 12 months.

General

The testing procedure with water should be carried out with milk meters that are cleaned properly.

Reference value

- The "reference value" of the "Meltec" milk meter is the average of the dif-feren-ces between display value and weigh-beam-/bascule-value, found dur-ing the testing proce-dure with water of the installation test or a reference value deter-mined later.
- When proceeding to periodic checking, the reference values are handed over for support.

Required equipment

- A sucking set:
- Tube with a sucking pipe with rubber top and a sucking opening of 3.5 mm.
- Air inlet of 1 mm.
- Electronic weigh-beam/bascule.
- Some buckets of sufficient capacity.
- Some receivers for the collecting of testing liquid.

Testing liquid

- Tap water; temperature not critical
- No addition of salt or acids.

The principle of the test

- Fill a bucket with exactly 15 kg of testing liquid.
- Suck an amount of water through the meter till 10 kg on the display.
- Weigh the bucket with the remaining water.
- Calculate the difference between the display-value and the sucked quantity of testing liquid.

Quality of the observations/measuring

- If the first measuring value deviates +/- 0.1 kg from the reference value: meter = correct.
- If the first measuring value deviates more than 0.1 kg from the reference value, proceed to a second measuring.
- If duplicate measuring have an average deviation of $\leq$ +/- 0.2 kg from the reference value: meter = correct.

- Difference duplo's $\leq$ 0.1 kg.

Deviating meters

When the measuring do not come up to this standard, the testing procedure should be repeated after checking and, if necessary, dismantling of the meter. If it is still impos-sible to come up to this standard, the meter should be recalibrated/ adjusted or replaced.

Replacement or repair of meters

- When meters are replaced or when repairs influence the measuring, the meters are to be tested during the milking, after which the testing procedure with water should be carried out twice.
- This water test will then serve as "reference value".

Reporting of the results

The results of the periodic checking of the milk meters, as well as the interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milk recording organization.

Sampling equipment

- Check the sampling equipment for cleanness and parts.
- See to it that the sampling equipment is stored in a dry place, free from dust.

Hints for the sample taker and the farmer for correct sampling by means of Meltec Memolac 2

Before sampling

See to it that:

- the air inlet in the milk claw is opened;
- the sample test devices are con-nected to the meters in the right way; fast but not too tight, and the packing ring should be in-stalled properly;
- that there will be at least 2 reserve bottles (for good emptying);
- the sample bottle hangs free and in a vertical position;
- the flushing tap of the sample device is downwards during milk-ing in the direction of the measuring jug;
- the milk tube and the vacuum tube lead down to the sample cup;
- the equipment for sampling contains no water residues. (Uncarefulness in this mat-ter leads to a too low indica-tion of per-centages, espe-cial-ly where the first range of cows is concerned.)

Taking the sample

- the display of the meter should always be at zero before starting to milk another cow;
- see to it that the milk of the first discharge arrives in the sam-pling bowl;
- as soon as the cow has finished milking, the valve of the measuring chamber is open, then the display can be read off and the measuring cup can be changed;
- transfuse the sample 3 times by means of a mixture bowl and take the sample with a sample spoon; see to it that the sample cup is emp-tied well (to prevent contamination) before the sample cup is placed again;

After sampling

- remove the sampling equipment and clean all pieces carefully by hand in a cleaning- and disinfecting solution;
- see to it that the sampling equip-ment is stored on a dry place, free from dust and avoid direct sun light;
- keep the tap of the sampling equipment upwards (air supply).

Farmer, do rinse your equipment with acids on a regular basis!

METATRON MILK METERS

General

- The testing procedure with water should be carried out with milk meters that are cleaned properly. This has become even more important with the change of the test liquid from Circotop MB to Circotop MBX, since the latter is more sensitive to residue formation on the electrodes. With clean meters, MBX delivers very reliable data; internal measurements in the GEA Farm Technologies production site even suggest that there is less variation than with Circotop MB.
- If the installation has not been cleaned in daily rotation between acid and alkaline agent, a basic cleaning by a qualified service engineer is strictly recommended.
- Make sure that the software version for Dematron 70/75 is 7.11 or higher.
- The water test must be carried out without a connected sample cup.
- To accomplish the test procedure it is strongly recommended to abide by the user manual 7161-9000-004 (available in different languages).

a) Required equipment

- A GEA Farm Technologies sucking set:
  - Tube with flow restriction with a sucking opening of 2.8 mm.
  - Air inlet of 1.2 mm.
- Electronic weigh-beam/bascule.
- Some buckets of sufficient capacity.

b) Test liquid

- Water; the temperature of the water should be between 10 and 25 °C.
- Addition of 70 ml Circotop MBX per 10 kg of water.

c) The principle of the test

- Before the first measurement, draw approx. 3-5 kg of calibration through the meter.
- Use the start-stop-start button.
- When "stimopuls" appears on the display, keep pressing the start-button until normal pulsation starts.
- Suck 10 kg of the test liquid through the meter.
- Read the display value.
- The test liquid is collected in a milk reservoir for recycling.

Reference value

- The "Reference Value" of the "Metatron" milk meter is the average of 3 or more results achieved during the water test of the installation test (see example below).
- When proceeding to periodic checking, reference values are handed over for support.
- In order to determine a trusted mean value / reference value from the water test, it is of high importance to carry out a sufficient number of measurements.

Reason:

- Flow rate for measurements with water 3 - 3.2 kg/min
- Sudden stop of measurement at this flow rate
- Due to inherent characteristics Metatron/DemaTron shows a failure rate of +/- 1,5% at this flow rate
- At a normal end of milking, this systematic failure is as low as +/- 0,6 %
- Random errors may add up or subtract

Stall	Measurement (kg)					Reference value (kg)
	1	2	3	4	5	
1	10.1	10	10.2			10.10
2	10.2	10.4	10.3			10.30
3	10.2	10.6	10.5	10.4	10.4	10.42
4	10.2	10.6	10.6	10.3	10.4	10.42
5	10.2	10.7	10.6	10.4	10.3	10.44
6	10.7	10.3	10.3	10.5	10.3	10.42
7	10.7	10.6	10.6			10.63

Yearly routine test

- As written above, the new test liquid Circotop MBX is more sensitive to residue formation. If a reference value has been determined with Circotop MB and the routine test is done with MBX for the first time, at least 3 measurements per meter should be accomplished. If the mean value of those 3 measurements deviates 0.2 kg or more from the reference value, or if 2 of the values differ more than 0.2 kg from each other, a basic cleaning by a qualified service engineer has to be done!

In any other situation proceed as follows:

- If the first measuring value deviates 0.1 kg from the reference value: meter = correct.
- If the first measuring value deviates 0.2 kg or more from the reference value, proceed to a second measurement.
- If 2 consecutive measuring values differ more than 0.2 kg from each other, proceed to a third measurement.

- If duplicate measurements show an average deviation of 0.2 kg or less from the reference value: meter = correct. If a meter does not come up to this standard during the periodic checking, proceed to a third, fourth or even fifth measurement.
- If there still is a difference of more than 0.2 kg to the reference value after 5 measurements, a correction should be applied to the meter (see stall 8 below). After the correction it is not necessary to start a new series of measurements.
- Applying a correction before 5 measurements are done is not recommended by GEA Farm Technologies.

Example for the measurements by the yearly routine test:

	Measurement (kg)									
Stall	1	2	3	4	5	Mean value (kg)	Reference value	Deviation (%) from reference value	Decision	Correction
1	10.2					10.20	10.10	1.0%	OK	
2	10.1	10.3				10.20	10.30	-1.0%	OK	
3	10.1	10.4	10.3			10.27	10.40	-1.3%	OK	
4	10.2	10.2	10.3	10.5		10.30	10.5	-1.9%	OK	
5	10.2	10.6	10.3	10.4		10.375	10.52	-1.4%	OK	
6	10.2	10.6	10.6			10.47	10.44	0.3%	OK	
7	10.7	10.5	10.5	10.4	10.4	10.5	10.3	1.9%	OK	
8	10.7	10.5	10.6	10.5	10.6	10.58	10.30	2.7%	Not OK	-2%

- Stall 8: After the correction is applied, the measurement result will be diminished by 2%, resulting in a value of approx. 10.37 kg.

a) Deviating meters

- If the average of 5 measurement values deviates 5% or more from the reference value, a service engineer has to be consulted in order to check the outlet valve or for other technical problems. If necessary, the meter should be repaired or replaced.

b) Replacement or repair of meters

- When meters are replaced or when repairs influence the measuring, the meters are to be tested during the milking, after which the testing procedure with water should be carried out (at least three times).
- This water test will then serve as "reference value".

c) Reporting the results

- The results of the periodic checking of the milk meters, as well as interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milk recording organization.
- When the sensor-value is changed, the new sensor-value is to be recorded on the measuring form.

d) Sampling equipment

- Check the sampling equipment for cleanliness and completeness of parts.
- See to it that the sampling equipment is stored in a dry place, free from dust.
- Avoid direct sunlight.

MILKO-SCOPE MK II MILK METER

Frequency of periodic checking at least once in 12 months.

General

Besides measuring accuracy, also check on cleanliness, quality of rubber parts, functio-ning of clip mechanism (hanging crooked) and readability calibration.

Reference value

None; see below the principle of the test and quality of the observations/measuring.

Required equipment

- A sucking set:
  - Tube with a sucking opening of 8 mm.
  - No air inlet.
- Electronic weigh-beam/bascule
- Some buckets of sufficient capacity.

Testing liquid

- Normal tap water
- Eventually addition of a little chlorine (in connection with infection) or
- Regularly refreshing the test water.

The principle of the test and evaluation of the observations/measuring

- Suck 10 kg of test liquid
- Read the display value (without use of a reading ring)
- The result of the measure tube should be 10.3 kg +/- 0.2 kg.

Deviating meters

When the measuring do not come up to this standard, the testing procedure should be repeated after checking and, if necessary, dismantling of the meter. If it is still impos-sible to come up to this standard, the meter should be recalibrated/adjusted or replaced.

Replacement or repair of meters

All new meters are to be tested on measuring accuracy before deploying. This also applies for meters from which the measuring spout is renewed during control.

Reporting the results

The results of the periodic checking of the milk meters, as well as interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milk recording organization.

MM15 (PREVIOUSLY FLOMASTER 2000/ALPRO OR FLOMASTER PRO)

Frequency of periodic checking at least once in 12 months.

General

- The testing procedure with water should be carried out with milk meters that are cleaned properly.
- The equipment of BJ- and BK-production series and newer versions for personal computers should be washed first with hot water of 45 C.

Reference value

For the Flomaster 2000, no specific "reference value" is used, but there is a standard deviation of 0.2 kg between the display-value and the value indicated by the weigh-beam/bascule for each meter, at the moment of measuring. Moreover, when proceeding to periodic checking, results of former checks will by handed over for support.

Required equipment

- An Alfa Laval sucking set:
  - Tube with a sucking pipe with a sucking opening of 5 mm.
  - Air inlet of 0.8 mm.
- Electronic weigh-beam/bascule.
- Some buckets of sufficient capacity.
- Some receivers for the collecting of testing liquid.
- Thermometer.

Testing liquid

- Normal tap water for series older than the BJ and BK-series.
- From the BJ- and BK-series onwards, water with a temperature of ± 37 C.
- No addition of salt or acids.

The principle of the test

- Fill a bucket with ± 12 to 13 kg of testing liquid and determine the exact weight of it.
- Suck ± 10 kg of water through the meter and stop the supply of water by means of a tube clip on the sucking tube.
- Let the water before the tube clip flow back into the bucket and empty the milk tube behind the tube clip in the meter.
- Press the button F5, then press Send and wait till (C).

- Read the display and weigh the bucket with the remaining water.
- Calculate the difference between the display-value and the sucked quantity of testing liquid.

Quality of the observations/measuring

- If the first measuring value deviates 0.1 kg from the reference value (this is the sucked quantity of water): meter = correct.
- If the first measuring value deviates more than 0.1 kg from the reference value, proceed to a second measuring.
- If duplicate measuring have an average deviation of 0.2 kg or less from the reference value: meter = correct.

Deviating meters

When the measuring do not come up to this standard, the testing procedure should be repeated after checking and, if necessary, dismantling of the meter. If it is still impossible to come up to this standard, the meter should be recalibrated/adjusted or replaced.

Replacement or repair of meters

- When meters are replaced or when repairs influence the measuring, the meters are to be tested during the milking, after which the testing procedure with water should be carried out twice.
- The standard, with which the meter has to comply, is described before.

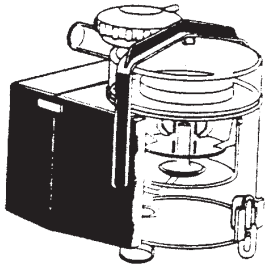
Reporting of the results

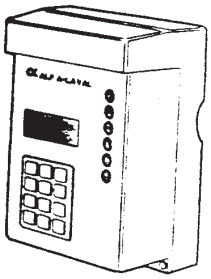
The results of the periodic checking of the milk meters, as well as the interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milk recording organization.

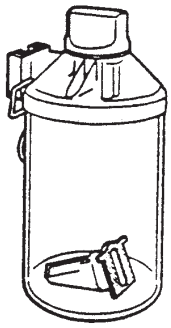
Sampling equipment

- Check the sampling equipment for cleanness and parts.
- See to it that the sampling equipment is stored in a dry place, free from dust.

Hints for the sample taker and the farmer for correct sampling by means of Flomaster 2000 / Alpro FloMaster Pro







Before sampling

- make sure that the air inlet in the milk claw is opened;
- disinfect the sample equipment in a cleansing solution;
- take the plug of rubber out of the meter;
- place the sample equipment in the meter;
- push the bowl, provided with a cover, on the meter and pull the spring clamp over the joggle of the housing;
- open the sampling cock;
- make sure that all equipment for sampling contains no water residu-es. (Un-carefulness in this matter leads to a too low indica-tion of percentages, especially where the first range of cows is concerned).

Taking the sample

- the display of the meter should always be at zero before starting to milk another cow;
- as soon as the cow has finished milking and the cluster has been taken off, check if there is a square before the quantity-indication on the display. If so, press the F4 button for the last dump;
- as soon as the sign [appears befo-re the quantity-indication on the display, the quantity can be read off;
- turn off the cock on the sample bowl cover;

- change the bowl for an empty one and turn open the cock on the cover again;
- transfuse the sample 3 times by means of a mixture bowl;
- directly after doing so, the sample should be taken;
- place the bottles upside down to leak.

After sampling

- remove the sampling equipment and clean this carefully by hand in a cleansing- and disinfecting solu-tion (Alfa 1 or Alfablink);
- store the sampling equipment on a dry place, free from dust.

Farmer, do rinse your equipment with acids on a regular basis!

MR 2000 MILK METER also called COMBINA 2000

Frequency of periodic checking at least once in 12 months.

General

The testing procedure with water should be carried out with milk meters that are cleaned properly.

Reference value

- The "reference value" of the "MR 2000" milk meter is the average of the two measuring with water, found during the testing procedure with water of the installation test or a reference value that is determined later.
- When proceeding to periodic checking, reference values are handed over for support.

Required equipment

- A Gascoigne/Melotte sucking set:
  - Sucking tube with a sucking opening of 4 mm.
  - Air inlet of 1 mm.
- Electronic weigh-beam/bascule.
- Some buckets of sufficient capacity.
- Some receivers for the collecting of testing liquid.
- Thermometer.

Testing liquid

- Water with a temperature of 20 C +/- 5 C.
- Addition of 60 grams of salt per 20 kgs of water.

The principle of the test

- Suck 10 kg of testing liquid.
- Read the display value.

Quality of the observations/measuring

- If the first measuring value deviates 0.1 kg from the reference value: meter = correct.
- If the first measuring value deviates more than 0.1 kg from the reference value, proceed to a second measuring.
- If duplicate measuring have an average deviation of 0.2 kg or less from the reference value: meter = correct.
- The difference between duplicate measuring should not be bigger than 0.2 kg.

Deviating meters

When the measuring do not come up to this standard, the testing procedure with water should be repeated after checking and, if necessary, dismantling of the meter. If it is still impossible to come up to this standard, the meter should be recalibrated/adjusted or replaced.

Replacement or repair of meters

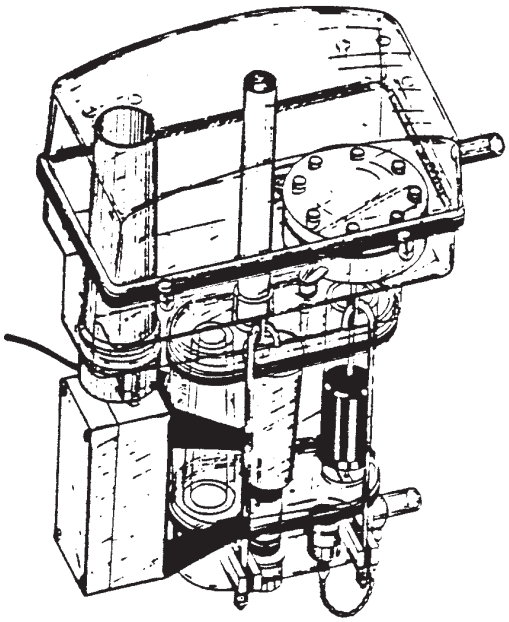
- When meters are replaced or when repairs influence the measuring, the meters are to be tested during the milking, after which the testing procedure with water should be carried out twice.
- This water test will then serve as "reference value".

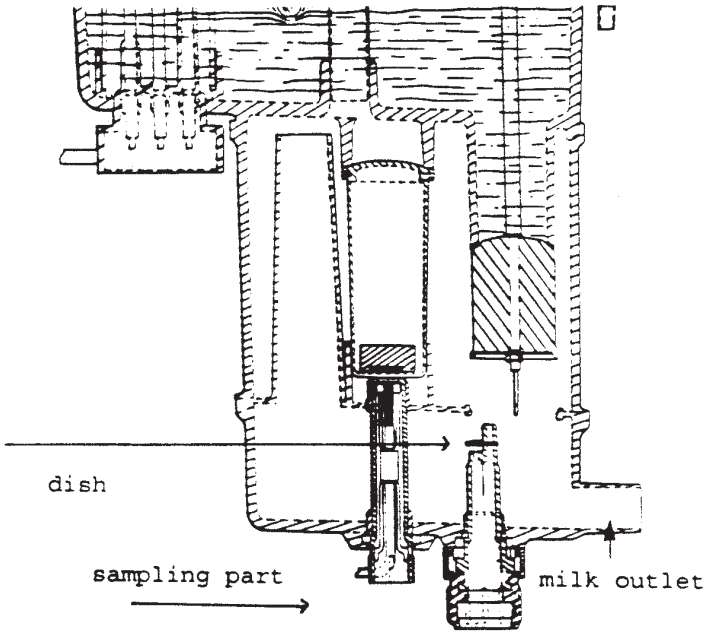
Reporting the results

- The results of the periodic checking of the milk meters, as well as interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milkrecording organization.
- When the sensor-value is changed, the new sensor-value is to be recorded on the measuring form.

Sampling equipment

- Check the sampling equipment for cleanness and parts.
- See to it that the sampling equipment is stored in a dry place, free from dust.





Hints for the sample taker and the farmer for correct sampling by means of Gascoigne/Melotte MR 2000 Combina 2000

Before sampling

See to it that:

- the air inlet in the milk claw is opened;
- the air inlet in the meter cover is opened (the meter does not operate correctly in case of blockage, this will give deviating contents);
- the sampling device with bayonet joint is installed correctly while turning it to the left (correct placement: dish is turned away from the milk outlet);
- the equipment for the sampling contains no water residues. (Uncar-efulness in this matter leads to a too low in-dication of per-centages, especially where the first range of cows is concerned).

Taking the sample

- when taking a sample, the switch on the front side of the reset box has to be in the middle position;
- the display of the meter should always be put at zero by hand, before starting to milk another cow;
- if the cow kicks off the cluster during milking and when it is con-nected again, the meter will continue counting after replacement. This is applicable for both automatic and manual take off, even when the cluster is already drawn up;
- after the cow is off, one should wait for the last dump (± 30 seconds);
- if the F-sign appears on the left side of the milk yield-indication on the display box, the quantity of milk can be read off and the sample bot-tles can be changed;
- the F-sign does not appear in cases where a control box (2 meters per box) is installed;
- the filled sample bottle will be turned over for several times, trans-fused in the mixture bowl and then a sample will be taken by means of the sample spoon;
- it is to be recommended to use a draining rack for good emptying of bowls and bottles;
- it is desired, that there are some sample bottles extra on the farm during the milk recording.

After sampling

- the farmer removes the bottles and the sample equipment for a careful cleaning by hand;
- store the sample equipment and bottles on a dry place, free from dust.

Farmer, do rinse your equipment with acids on a regular basis!

MK V MILK METER

Periodic test procedure

In conjunction with the periodic milk meter inspection, all milk meters should be checked for accuracy at least annually.

This test procedure is the same as that specified by the DHIA and approved by ICAR.

Basic test rig set up

(Refer to Figure 1)

1. The milk meter is mounted such that the meter base is level.
2. The milk meter suction hose rests in an open 18 litre (40lb) pail (D) directly below the meter. It has an inlet restrictor (G) to ensure a flow of 3.5 to 4.0 litres per minute at the available vacuum level. An air admission hole (F) 600mm (24 inches) from the meter inlet admits 0.5 cfm (free air) (15 l/min FA). This hole size is 1 mm (No.60 drill).
3. The milk meter outlet hose falls directly to the inlet of a vacuum trap (H), (for example test bucket, pail milker, or weigh jar). The vacuum trap outlet is connected to a stable vacuum source of nominally 50kPa (15" Hg).
4. A vacuum tap (C) is fitted on the milk meter inlet hose and the vacuum source hose (B).
5. Volumetric flasks or accurate scales will be required.

Basic test procedure

1. Using water as the working fluid fill the supply pail (D) with 16 litres (16 kg or 35.24lb).
2. Open the source vacuum tap (B). (Inlet tap C closed).
3. Ensure the three way tap is wet, properly seated and in the horizontal (milking) position.
4. Open the inlet hose tap (C).
5. Draw all of the water from the supply pail (D) through tube (E) past the air admission hole (F) through the milk meter (A) and into the vacuum trap (H).
6. Record the milk meter flask reading. (Read the bottom of the meniscus).
7. Turn the three-way tap to drain (upwards) and operate the flask depressor to empty the flask.
8. When flask is empty close the source vacuum tap (B).
9. When vacuum trap (H) has returned to atmospheric pressure

   close the inlet hose tap (C).
10. Return the three-way tap to `milking' position, refill the supply pail with exactly 16 litres of water and repeat the procedure, to obtain two results per meter.

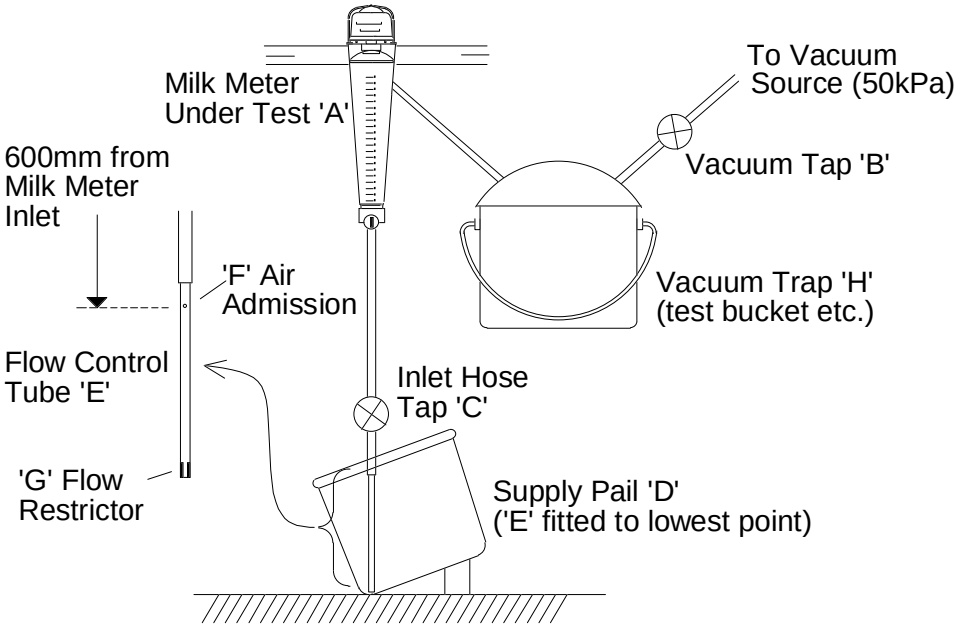


Figure 1. Basic milk meter test rig.

Results analysis

Calculate the `p-values' for each reading as follows:

(Working in kilograms)

$$p = \frac{\text{meter reading}}{16.48} x\,100\%$$

If both 'p-values' are in the range 97% to 103% the milk meter is considered acceptable.

If only one of the 'p-values' is outside the range 97% to 103%, perform the test a third time. The meter is then considered acceptable if no single 'p-value' is outside the range 95% to 105% and the mean of all three values is within the range 97% to 103%.

Any milk meter failing this test should be withdrawn from service and submitted to a certified service agent for repair and recalibration.

Note

The periodic test procedure should be regularly followed to give confidence in milk meter results.

Repair and recalibration procedure

This section covers repair and recalibration of the Waikato milk meter, which may be undertaken only at a certified Repair and Recalibration Centre (e.g. DHIA in the USA).

Milk meters submitted to this procedure will be those that have damaged calibration dependent parts, or those that fail the Periodic Test Procedure.

Damaged milk meters

The parts of a milk meter that may affect calibration are the flask, cover, and base assembly.

Damaged parts should be replaced and the other main parts closely inspected as per the 'Periodic Inspection Procedure'.

The milk meter is then re-tested under the 'Periodic Test Procedure'. The resultant meter p-values must meet the criteria specified.

Milk meters that fail 'periodic test procedure'

With only three parts to interchange, a simple process of elimination is used to recalibrate the milk meter.

- Replace the base assembly and retest.
- If the meter fails, replace the cover and retest.
- If the meter fails, replace the flask and retest.

A failure at this point is unlikely, but if a single case occurs, repeat the inspection and replacement procedure. If a large number of failures occur at this point, check test rig and testing procedure for any points of non-compliance with these recommended procedures.

ORION MMD500

PERIODIC CHECKING METHOD

General

- The periodic checking will be done at least once in every 12 months.
- The testing procedure with water should be carried out with milk meters that are cleaned properly.
- The water test must be done without the sampler connected.
- The system vacuum level must be 40 to 60kPa (equal as used by determine reference).

Reference value

- The "reference value" of the MMD500 milk meter is the average of the two measurements with water, found during the testing procedure with water of the installation test or a reference value determined later and are handed over for local support (procedure is described in the installation manual - Milking Test at Dairy Farm, Determine Reference value).

Required equipment (ref. figure 1 and figure 2)

- Milk hoses with a 15-16 mm internal diameter (refer the figure1).
- An air inlet tube of 1.2 mm (supplier: ORION).
- Flow reducer (Flow ca 5.0 kg/min) with a water sucking opening of 3.8 mm (supplier: ORION).
- A shut-off valve (supplier: ORION).
- Calibrated electronic scale (min. accuracy 20 g).
- Some buckets of sufficient capacity (min. 25 liter).
- Some milking pails for the collecting of test water.
- A thermometer (accuracy $\pm$ 1 °C).

Testing liquid

- Potable water should be used.
- Water with a temperature of 25 °C $\pm$ 10 °C.
- Addition of around 50 grams of salt per 20 kgs of water (Salt: NaCl content of 99% or more).

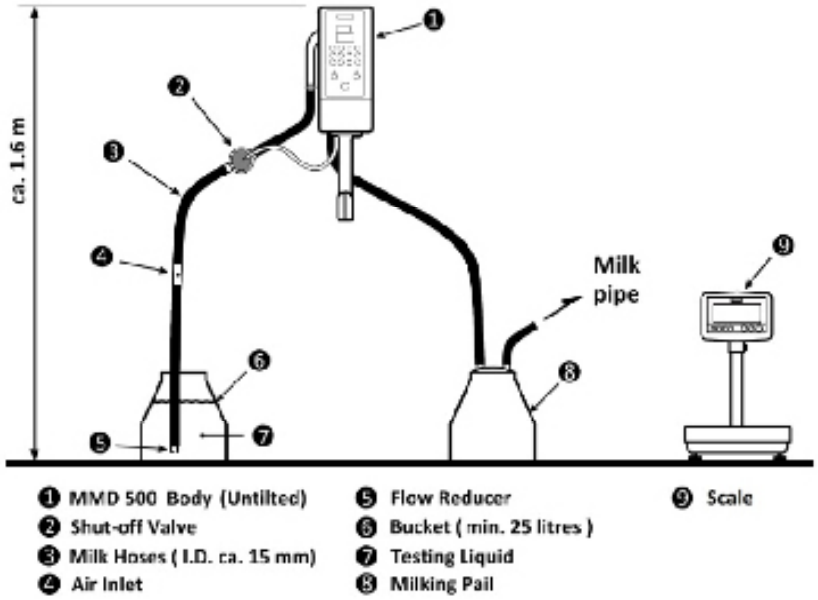


Figure 1. Water test. Secure MMD500 at a height of approximately 1.6 meters (un-tilted).

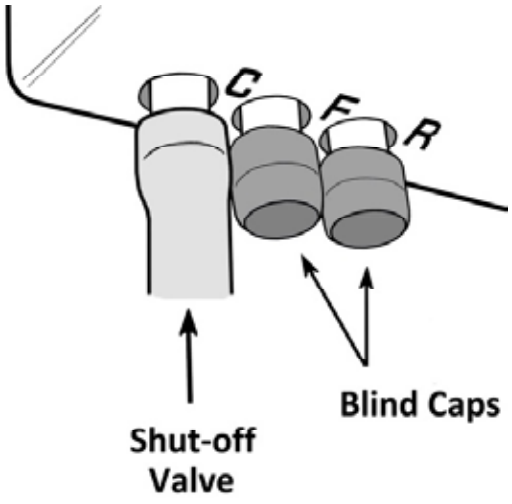


Figure 2. Positions of blind caps (Ports "F" and "R" of triple tube connection on the bottom of MMD500 body).

The principle of the test

- **Clean the holes of the air inlet and the flow reducer by cleaning needle prior to testing.**

Procedure

1. **Switch on the vacuum pump of the milking system.**
2. **The vacuum level should be the same (±1kPa) with one is during taking the reference value. Adjust the level, if need. Record the vacuum level.**
3. **Check and record of the weight of milking pail for receiving the test water prior to testing: the initial weight**

Procedure

1. Switch on the vacuum pump of the milking system.
2. The vacuum level should be the same (±1kPa) with one is during taking the reference value. Adjust the level, if need. Record the vacuum level.
3. Check and record of the weight of milking pail for receiving the test water prior to testing: the initial weight
4. Prepare for the test as figure 1.
5. To switch on the MMD500 in test mode, hold down <4 and 6> simultaneously on MMD500 keypad and insert the milk connection to the milk tap. Then, check the cow # display of the MMD500 shows "**tESt**" which means the MMD500 is in its test mode.
6. Press key "START" to start a countdown timer of 2 minutes which is built-in the MMD500 and then MMD500 starts to suck the test water and measure the weight.
7. At the end of the countdown, the MMD500 stops its measurement automatically.
8. Record the reading of MMD500 display.
9. Measure the weight of the milking pail with the collected test water and then subtract "the initial weight" from this weight to fix "the collected weight" for the test.
10. Determine the difference in kg between the reading of MMD500 display and the collected weight. And record it as the measuring value.

The water may be collected for recycling, but the quantity should be checked each time.

Quality of the observations/measurements

- If the first measuring value deviates 0.1 kg from the reference value: meter = correct.
- If the first measuring value deviates more than 0.1 kg from the reference value, proceed to a second measuring.
- If duplicate measuring have an average deviation of 0.2 kg or less from the reference value: meter = correct.
- When a meter does not come up to this standard during the periodic checking, proceed to a third or fourth measuring.

Deviating meters

- When the measurements do not come up to the standard, the testing procedure with test water should be repeated after checking the equipment, which may include, among other things, the air flow of the sucking set, tilting of the milk meter body, straightening up, and if necessary, dismantling of the meter.
- If it is still impossible to come up to the standard, the meter should be calibrated/adjusted or replaced.

Replacement or repair of meters

- When meters are replaced or when repairs influence the measurement, the meters are to be tested during the milking, after which the testing procedure with the water test should be carried out twice.
- This water test will then serve as "reference value".

Sampling equipment

- Check the sampling equipment for cleanness and parts.
- See to it that the sampling equipment is stored in a dry place, free from dust.

Hints for the sample taker and the farmer for correct sampling

Before sampling

See to it that:

- The meters are cleaned properly
- The air inlet of the claw is opened
- The sampling devices are assembled correctly
- The sampling devices are connected to the meters in the correct manner.
- All equipment for sampling contains no water residues (carelessness in this matter leads to a too low indication of percentages, especially where the first range of cows is concerned).

Taking the sample

- The display of the meter should always be at zero before starting to milk another cow.
- After the cow is off, to have a good mixing of sampled milk, the sample taker must rotate the "Valve core" of the sampler to let its outlet comes right below exactly to allow an efficient air bubbling for about 10 seconds.
- Just after the mixing, the sampler must take sample immediately.
- After the end of sampling procedure for the cow, the valve core should be handled to drain all of the remained milk in the sampler bottle toward the milk pipe.
- Before starting to milk the next cow (after moving the equipment), the valve core should be handled once again to drain all of the remained milk in the sampler bottle toward the milk pipe.

The operational panel

- When the milking cluster is kicked off and "automatic removal" occur, one should press the "Detach/Cancel button", in order to retain the milk quantity that is already measured, and re-start the milking of the cow. The milk quantity after re-starting will be adding to the retained milk quantity.

After sampling

- The farmer removes the sample equipment for a careful cleaning by hand;
- Disassemble the sampler valve mechanisms and clean in a wash sink or vessel.
- The sampling equipment must be stored in a clean, dry place, free from dirt and out of direct sunlight.

CALIBRATION METHOD AT DAIRY FARM

Determine calibration value

STEP 1

1. Check the current calibration value of each MMD500 milk meter and record it as the initial calibration value prior to the milking test.
2. Collect the milk into the milk bucket via milk meter.
3. Measure the collected milk by a calibrated electronic scale and the measured value is defined as the Reference.
4. Record the observation with the MMD500 display reading and the Reference and then calculate the difference between them using the next formula.

$$\text{Difference}(\%) = \frac{\text{Milk Meter reading}(kg) - \text{Reference from the scale}(kg)}{\text{Reference from the scale}(kg)} \times 100$$

5. Take minimal 3 readings per a milk meter and calculate the differences (if the three readings not differ more or less equally it is advised to take more readings).
6. If the average difference is less than or equal to 3% and the average difference of all the milk meters on the farm is less than or equal to 2%, the current calibration of the milk meters are correct[a].

   No further observations are necessary. It is recommended to determine calibration around ZERO (between -1 and +1%).
7. If the difference can not meet the above mentioned judgment condition, the milk meter (s) involved must be recalibrated and assessed according to STEP 2 and STEP 3.

[a]ICAR Guidelines / Chapter 11.6.1.1.(Edition 2012): The calibration of the milk meter is considered correct if the average difference is less than or equal to 150 % of the limits for bias (2%) according to table11.2 and the average difference of all the devices on the farm shall be less than or equal to 100% of the limits for bias according to the table 11.2

STEP 2

1. If the difference is exceeding the judgment condition, the milk meters involved must be recalibrated according to the following procedure.

Recalibration Example

1. If the Initial calibration value is - 2 and the average difference is - 5%:

   - 1 x - 5 = 5
   - 2 + 5 = 3

Result: the corrected recalibration value is 3.
Input the new value into the milk meter.

2. Record 3 new readings per the recalibrated milk meter and calculate and evaluate the result in the same manner described in STEP 1.
3. If the difference is out of the judgment condition, perform STEP 3.

STEP 3.

1. The milk meter(s) which is failed in STEP 2, 3 more readings must be done and the average difference of six readings will be calculated.
2. The calibration of the milk meter is considered correct if the average difference is less than or equal to 3%.
3. If not, the milk meter is not acceptable and readjustment, repair or replacement has to be done by the manufacturer, after which the above procedure has to be repeated.

Determine Reference Value

1. When meters are installed or replaced or when repairs influence the measurement, the meters are to be tested during the milking, after which the testing procedure with the water test should be carried out twice.
2. The average of the two measurements will then serve as "reference value".
3. When proceeding to periodic checking, the reference values are handed over for support. This report includes:
   - Farm information
   - Meter and/or serial #
   - Vacuum level during determine reference value
   - Calibration value
   - Reference value

4. The explanation how to fulfill the water test is described in the document "Periodic Checking Method" with special attention to properly cleaned milk meters, required equipment, test liquid and the principle of the test.

Table 1. Example (use of ORION "Reference Value Recording Sheet" is recommended):

MMD500 No. / serial #	Calibration value	Reading of display [kg]	Measuring value [kg]	Difference [kg]	Reference value (average of 2 differences) [kg]
12345	-2	10.0	10.32	-0.32	**-0.34**
		10.0	10.36	-0.36	
06789	0	10.2	10.38	-0.18	**-0.17**
		10.2	10.36	-0.16	

Remark: Own readings and differences can differ from above due to control board and calibration value.

PULSAMETER 2-1

Calibration instructions for milk meter "Pulsameter 2-1" with water

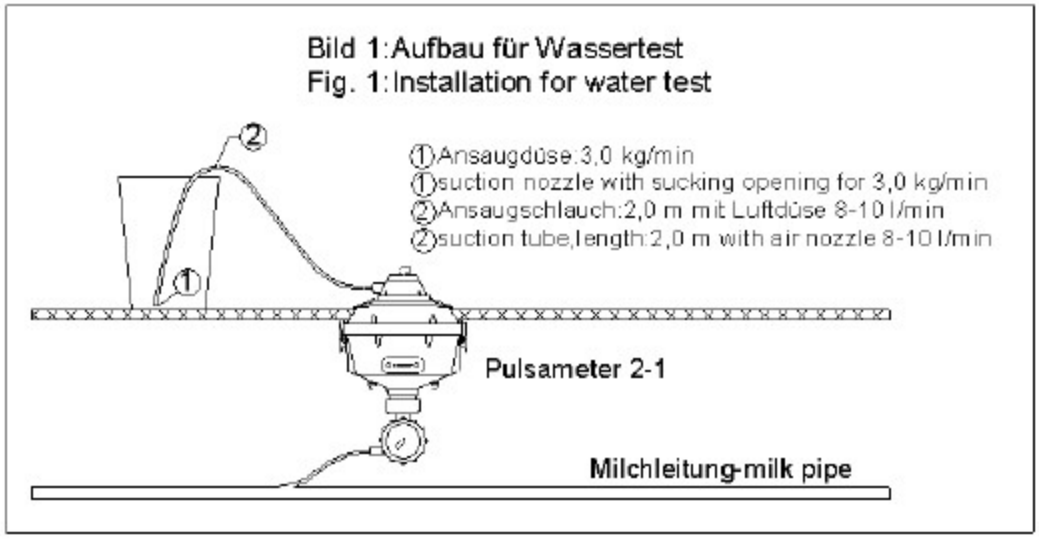
The device is pre-set at works. After installation at the milking position, an adjustment to the particular milking installation has to be carried out by a fine calibration. Therefore it is essential that you please pay attention to the following advices:

Commissioning

When the milking installation is put into operation the first time or when exchanging the Pulsameter 2-1, the calibration value '100' is set at all milking positions. Checking and fine calibration is to be done 4 weeks after the first commissioning, as the bearing points of the tipping scale are running stable by then. The fine calibration is carried out acc. point 2 and 3 of these instructions. At the first calibration as well as at routine checks, always qualified personnel are to be consulted, in order to remedy distinguishable deficiencies before the calibration.

Required equipment (Fig.1)

- A suitable milk can.
- A scale with 10g -resolution.
- Standardised intake tube with concave intake nozzle (3kg/min) and air nozzle (8-10 l/min).
- A bucket of at least 10 kg capacity.
- Measuring report of the last fine calibration (only necessary at routine checks).
- Thermometer.



Procedure of the water test

Before the actual calibration, the previously set calibration value at is to be recorded in the measuring report and the installation has to be thoroughly cleaned and then rinsed.

- The bucket is to be filled with water with a temperature of ca. 30°C. and is to be put on the platform of the cow.
- The long milk tube of the milking unit is to be taken off from the inlet connections and the standardised intake tube of the test unit is to be attached on these connections.
- Before every measuring the tipping scale is to be emptied by operating the two air inlet plates on the top.
- The end of the tube with intake nozzle is to be dipped down to the bottom of the bucket. The concave end of the intake nozzle avoids that the nozzle adheres at the bottom.
- By the program "Milking", the water is to be sucked off out of the bucket. The suction nozzle must not suck air and must not be blocked.
- Afterwards press the button for end of milking
- Read the display
- The displayed quantity should be 10 ± 0,2 kg

Setting / correction of the calibration value

- At least 2 measurings acc. to point 3. are to be carried out.
- If the displayed values are 10.0 ± 0,2 kg, the previous calibration value remains unchanged and no further measurement is necessary.
- If the displayed values exceed these limits, a correction is necessary.
- Afterwards, a new test for checking is carried out. If this measuring is within the range of tolerance, the calibration is completed.

Examples:
First measuring: Display 9.9 kg
Second Measuring: Display 10.0 kg
Result: OK

or

First measuring: Display 9.7 kg
Second Measuring: Display 9.8 kg
Increasing the calibration value of 2.0 g, followed by a further test for confirmation.

or

First measuring: Display 10.3 kg
Second Measuring: Display 10.3 kg
Result: Reducing the calibration value of minus 3.0 g, followed by a further test for confirmation.

In case, a correction of the calibration value has to be done, it always must be referred to the nominal size of 10,0 kg and corrected accordingly.

e.g. at
Display 9.7 kg increasing the calibration value of + 3 g
Display 10.4 kg reducing the calibration value of -4 g
Display 10.2 kg reducing the calibration value of -2 g

The new-determined calibration value is to be recorded in the measuring report.

Prevention of measurement errors

To avoid mistakes in measurements, please pay attention to the following important advices:

1. Basically, the calibration value is influenced by the housing (upper and lower part) as well as by the tipping scale. If one or more parts or a complete device is replaced / renewed, a new fine calibration as described in these instructions is mandatory and has to be recorded in the last measuring report!
2. An exchange of the in point 5.1 mentioned parts of different Pulsameter is possible, but only when followed by a calibration the metering precision is assured.
3. The service of all flexible and rubber parts at regular intervals has to be ensured.
4. The bearings and the impact points of the tipping scales have to be checked for wear at least once a year. At high-efficient milking installations the wear-check is to be done twice a year - e.g. at milking robots and milking positions with more than 40 milking units/day.

If you always fulfil these minimum requirements, you possess a milk meter of high quality with an international approval, which will always provide you with correct measurements in the long term.

SCR FREE FLOW METERS

The described procedure applies for all Free Flow meters, however different probes are used for the different Free Flow versions

SCR has proposed a procedure for a routine test consisting several elements. The purpose of this test is to determine whether the FREE FLOW-meter unit still functions as it did in the installation test. If one or more out of the mentioned tests fail, the meter should undergo a new farm test with milk (installation test). Based upon the proposal received and the experiences with the FREE FLOW milk meter in the Netherlands, together with the officials from KOM, a modified routine test for the SCR FREE FLOW meter was developed and validated.

Specification of the above-mentioned annual test factors:

1. Optical field integrity test : Test of the FREE FLOW optical field integrity: The FREE FLOW automatically detects abnormal reading if the optical field is damaged (mechanical / optical or electronic). In such a case the FREE FLOW will display a SERVICE message on it's display.
2. Free Flow visual inspection: The milk unit from cluster to Free Flow meters is checked for abnormalities with respect to leakages and so on. An extra level of test is by visual inspection of the FREE FLOW milk channel to detect dirt , protrusions or other abnormalities.
3. Milking parlour parameters: A general visual test of all milking components (milking machine, meter height, milking cluster, air bleeds, broken tubes) to verify there are no big changes or leakages. A new milking parlour, new milking clusters or other big changes, like a change in internal diameter of the long milk tube will result in a new installation test. The installation test has to be performed with milk as described in the installation test procedure.
4. Check of FREE FLOW internal parameters: By using a remote control unit Psion, the FREE FLOW internal parameters that affect the measurement are checked. If by some malfunction the parameters have been changed, these parameters can be restored to the original values. Two important parameters are the sub-software and the bias because they affect the measurement.
5. Flow test using probe: The probe test simulates a milk flow. The FREE FLOW flow reading is compared to the original reading when it was calibrated with milk. If the reading is the same then the optical field and the optical field + milk channel mechanics, transparency and color have all stayed the same so the FREE FLOW still measures the same. **The probe test can not be used to set a new bias to the FREE FLOW, a new bias should be set with milking cows.**

Optical field integrity test

The FREE-FLOW milk meter does not have any mechanical or moving parts. The internal software in the FREE-FLOW will alert upon detection of any change that cannot be compensated by the software.

Upon detection of such failures, the FREE-FLOW displays an error message on it's display and the farmer should consult the FREE-FLOW manual for the requested action to take. The testing procedure should be carried out with meters that are cleaned properly, i.e. after a main cleaning cycle of the milking machine.

Free Flow visual inspection

The milk unit from cluster to Free Flow meter is checked for abnormalities with respect to leakages, broken tubes, constrictions and so on. The Free Flow measuring channel is visually inspected to detect dirt , protrusions or other abnormalities, which may effect the performance of the Free Flow milk meter.

Milking parlour parameters

A general visual test of all milking components (milking machine, meter height, milking cluster, air bleeds, broken tubes) should be carried out to verify that there are no big changes or leakages. A new milking parlour, new milking clusters or other big changes, like a change in internal diameter of the long milk tube, makes it necessary to perform a new installation test. The installation test has to be performed with milk as described in the installation test procedure. The following parameters have to be taken into account : Vacuum level, type op milk cluster, long milk tube diameter, length of milk tube, length of tube between Free Flow meter and milk pipe line, height of Free Flow meter and air inlet (cluster air inlet and leakage). These 5 values represent milking machine parameters that if significantly changed may affect the FREE FLOW bias and therefore the results of the milk yield measurements.

The reference values should be recorded during the installation test and compared to when doing the routine test.

Vacuum level :	If vacuum level changed by more than 2.5kpa since the installation test, the routine test fails. The meters must be recalibrated with milk.
Claw type:	If another significantly different claw is installed, the routine test will fail. The meters must be recalibrated with milk.
Milk tubes:	If the diameter of the milk tubes between milking cluster and the Free Flow milk meter has been changed, the routine test fails. The meters should be recalibrated with milk. If the length of the milk tube between milking cluster and the Free Flow milk meter has been changed by more than +/- 10%, the routine test fails. The meters should be recalibrated with milk. If the milk tube between Free Flow meter and milk pipe line has been changed in diameter or in length, the routine test fails. The meters should be recalibrated with milk.
FREE FLOW height:	The height of the Free Flow meter relative to the cow platform: If this distance has been changed by more then 7 cm, the routine test fails. The meters should be recalibrated with milk.
Air inlet:	Increased air inlets or leakages will cause deviations in the reading of the Free Flow milk meter. If the air inlet has significantly changed by more than 10% compared with the installation test, for example by air leakages along the cluster to the Free Flow milk meter, the routine test fails. The meters should be recalibrated with milk. The air inlet can be observed by visual inspection and by measuring the air leakage using the methods as described in ISO 6690 – Mechanical tests for milking machines.

Check of FREE FLOW internal parameters

Each FREE-FLOW meter has the following reference values.

Optical channel: Two values that should be measured using a test probe. The reference values are measured upon initial parlor calibration and saved for subsequent periodic checks. It is imperative that the SAME probe is used for the initial and periodic checks.

Bias-Factor: One value that is used to fix the measured FREE FLOW bias.

Sub-Software: This number represent the algorithm used by the FREE FLOW to compute the yield. It is set when installing the FREE FLOW and must remain constant.

By using the Free Flow remote control unit, the FREE FLOW internal parameters are checked. These values are written down on the routine test form (annex 2). If by some malfunction the parameters have been changed, these parameters must be restored to the original values. If not, the meters should be recalibrated with milk.

Principle of the test

- Switch OFF all FREE FLOW-units
- Turn ON the FREE FLOW units and monitor each FREE FLOW display. Numbers will appear on the display and finally the FREE FLOW will display P-UP. Only 2 of the 3 last numbers displayed are used here. For example if upon power up the FREE FLOW displays the following :
  2
  A01
  151
  F100
  D444
  2141 : Sub-Software
  688
  1000 : Bias-Factor
  P-UP
  then only the values 2141 and the 1000 are used to write down on the form. The last number (1000) is the Bias-Factor. The 2141 is the Sub-Software identification. Because the numbers are displayed for only a short time, it is necessary to turn On and if each FREE FLOW -meter individually.
- If the Bias-Factor or the Sub-Software values are not the same as the ones recorded during the installation test, the FREE FLOW-meter fails in the routine test.

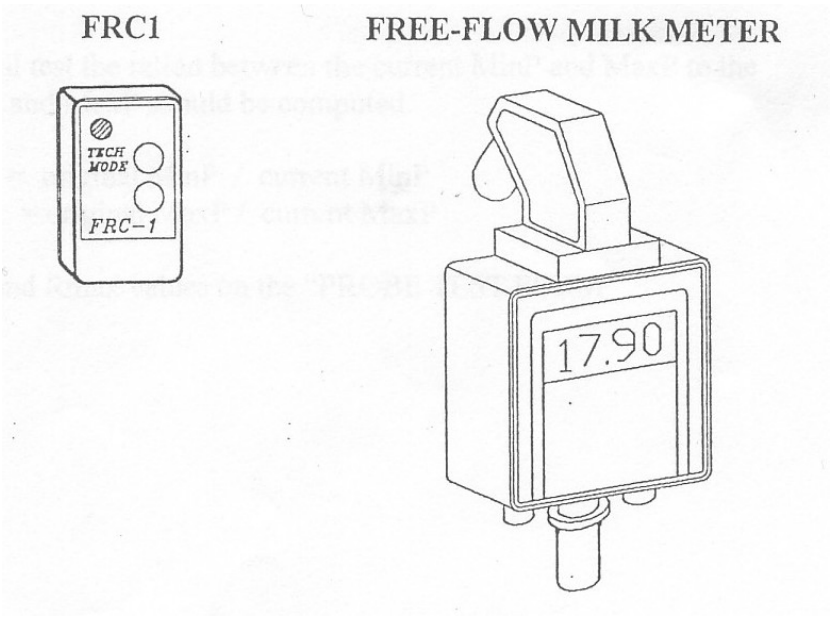


Figure 1. Remote control to check FREE FLOW internal parameters.

In cases where the Bias-factor or the Sub-software has been changed (not allowed however) for some reason, there are two possibilities:

1. Restore the original values using a technician level remote control.
2. Recalibrate with milk.

Probe flow simulation test

The probe test is simulating a milk flow. The FREE FLOW flow reading is compared to the original reading obtained during the installation test. If the obtained value is the same, then the optical field and milk channel characteristics, transparency and color have all stayed the same, so the FREE FLOW still measures the same as during the installation test.

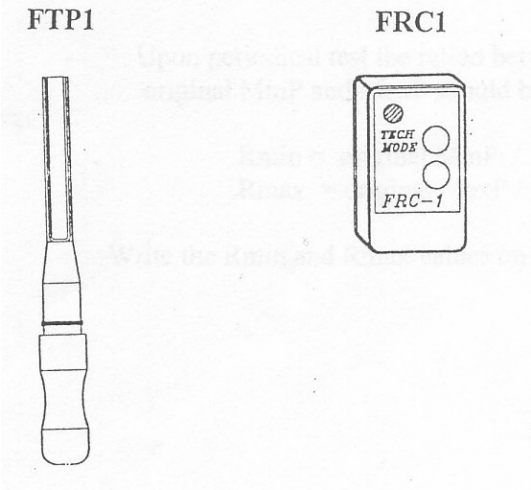


Figure 2. The probe FRT1 and remote control FRC1.

For this test, a probe (FRT1) and the remote control unit (FRC1), are required.

The FRT1 probe has several optical properties that simulate a milk flow. In the test mode, the FREE FLOW meter displays the milk flow that is generated by the probe. The probe fits in the interior measuring channel of the FREE FLOW meter. The probe should be cleaned before usage and as the probes are not perfectly identical, the same probe should be used during the routine testing. The probe belongs to the milking parlour and should be stored under good conditions on the farm, preventing pollution and/or mechanical damage. Such will effect the test results.

The FREE-FLOW remote control is needed to set the FREE FLOW meter to the technician mode. This technician mode is necessary to perform the routine test with the probe. No special maintenance is needed for the FREE FLOW meter prior to the routine test procedure.

- Set all FREE-FLOW units to technician mode using the remote control
- Wash the test probe GENTLY using any soft soap. Dry the probe afterwards
- Verify all FREE FLOW-channels are dry and clean
- Wait 10 minutes to verify all units are perfectly stable. If some FREE-FLOW units an **Hxxx** message show, wait until it disappears. The **Hxxx** message imply that the FREE-FLOW internal temperature is not stable yet.
- While the FREE FLOW-meter is in the technician mode and the FREE FLOW channel is dry, the FREE-FLOW performs an internal Self Test. The Self Test status is shown on the FREE-FLOW's display as **Cxxx** every 10 to 20 seconds. As long as the FREE-FLOW meter shows the **Cxxx** message the Self Test is ok. IF no **Cxxx** message is seen or if **SRVx** message appears the Self Test failed.
- If the Self Test failed the operator should verify that the FREE-FLOW channel is dry and clean and wait for the Self Test status again. If still the FREE FLOW Self Test fails, the operator can try to fix the problem by using the remote's "RECAL" option. If still the FREE_FLOW self-test fails the FREE FLOW meter is defective and should be replaced.
- If the **xxx** values are lower than 80, a RECAL of the FREE FLOW can optionally be done, although NOT mandatory. After RECAL the FREE FLOW with DISPLAY CXXX again but the XXX will be between 98 and 100.

- Insert the test probe into the FREE FLOW channel. After a few seconds the FREE FLOW should display a **PASS** message and two numbers. The two values represent the flows measured by the FREE FLOW meter. The lower number is the minimal flow and the higher the maximal flow measured. The numbers shown are 4 digits and usually between 3,000 and 4,000 kg per minute.
- Write the minimal and maximal flows on the "FREE FLOW routine test form" under **MinP** and **MaxP** columns.
- During the routine test, the ratio between the **current MinP and MaxP** to the **original MinP and MaxP** should be calculated.

  Rmin = original MinP / current MinP

  Rmax = original MaxP / current MaxP

  Write the **Rmin** and **Rmax** values on the "FREE FLOW routine test form"
- If Rmin and Rmax are between 0.98 and 1.02 the FREE FLOW meter is OK. Values outside the 0.98-1.02 range are too big and the FREE FLOW meter fails for the routine test. In case of FAIL the FREE FLOW channel should cleaned and inspected visually for any abnormalities. Note that most of deviation from the perfect 1.00 result is usually because the probe test is very sensitive. Small changes in the probe surface and/or cleanness will have some affect on the measurement.

Meters that failed the test should be inspected and if necessary cleaned internally and examined again. If a FREE FLOW Self test fails, a RECAL command using the remote control may fix the problem. A meter that continues to fail should be replaced.

Older Meters

Some older FRE-FLOW units will display only 3 digits during the probe test. These meters display **Pxxx** instead of xxxx. In those cases the P should be though of the digit 3 and the new number used. For example if the FREE-FLOW displays P678 then actually the number 3.678 is used.

Sampling equipment

- Check the sampling equipment parts and it's cleanness
- Store sampling equipment in a dry place free from dust.

TRU-TEST MILK METERS

How often should Tru-Test Milk Meters be water tested?

Tru-Test recommends that ALL Milk Meters are water tested at least once every 12 months.

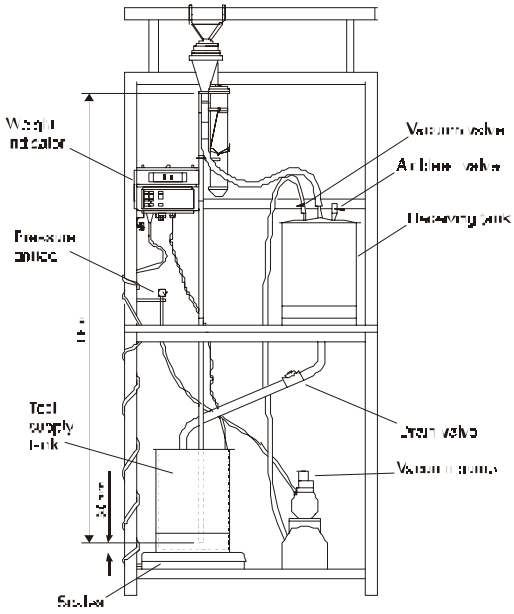
How do I know when water testing is due?

When a Milk Meter is tested, a label is affixed to it showing the date the test was performed. The Milk Meter should be tested within 12 months of this date.

Equipment required

Tru-Test Fast Flow Water Test Rig, MMA00057 or MMA00058

To test Tru–Test Electronic Milk Meters (EMM's), test rigs manufactured before 2005 must be modified with an air admission hole and rubber sleeve (MMG00015: fast flow test rig inlet tube with a rubber sleeve).



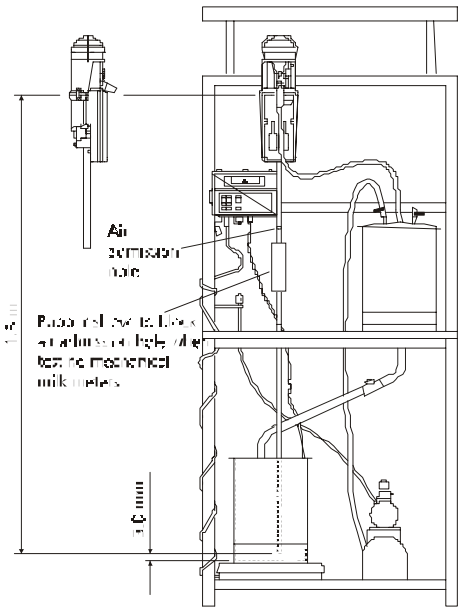


Figure 1. Equipment required.

Testing Tru-Test Electronic Milk Meters (EMM's)

Check the software

Ensure that the EMM and Data Handler software is up to date. The EMM should be running software build m3_7e (or newer), and the Data Handler software build r3_3e (or newer). Ensure that the Data Handler has been configured with the correct RC file by turning on the Data Handler. "Herd: fftr" should be displayed. A correct version of the RC file can be supplied by your Tru-Test representative.

To upload the RC file to the Data Handler:

1. Save the RC file in an appropriate directory on your PC.
2. Start LinkTTEMM and open the RC file.
3. Connect the Data Handler to a Data Transfer Unit and turn it on.
4. Upload the file from LinkTTEMM to the Data Handler.
5. Disconnect the Data Handler from the Data Transfer Unit.

Note: The RC file only has to be loaded once into the Data Handler. The settings will remain in the Data Handler until a new RC file is loaded.

Water test an Electronic Milk Meter

Note: Water testing will take about 90 seconds per Milk Meter.

6. Turn on the Data Handler. "TRU-TEST HERD MANAGEMENT", "Herd: fftr" is displayed.
7. Turn on the EMM. Push the wash valve up into the milk position. Wait for the sample rotor to come to a stop in the milk position.
8. Mount the EMM on the test rig. Visually check that the meter is vertical (within +/- 0.5 degrees).
9. Enter a unique animal ID (for this testing session) into the Data Handler and press Select on the EMM. A warning is displayed on the Data Handler if the EMM is not vertical.
10. Draw 16.0 L of test liquid through the EMM.
11. Wait for 3 seconds and close the inlet tube valve.
12. Wait for 10 seconds until the fluid settles.
13. Press Select on the EMM. The Data Handler displays the yield. Note the displayed number. The result should be 16.0-17.0 kg (16.5 ± 3%). The Data Handler will indicate whether the result is a Pass or a Fail.
14. Press Finished Milking Release Sample on the EMM.
15. Once the EMM is empty, close the vacuum valve, remove the EMM from the rig, and open the inlet tube valve.

Repeat the test for each EMM.

Turn off the Milk Meters and the Data Handler

1. Turn off the EMM's using the Data Handler. See "Tru-Test Electronic Milk Meter Operating Instructions" for instructions.
2. Turn off the Data Handler

Download and interpret the test data

1. Connect the Data Handler to a PC.
2. Turn on the Data Handler and download the test data using LinkTTEMM.

Each EMM should have a reading of 16.0-17.0 kg (16.5 ± 3%).

Testing Tru-Test Mechanical Milk Meters

Water test a Mechanical Milk Meter

Note: Testing will take about 90 seconds per Milk Meter.

1. Mount the Milk Meter on the test rig. Visually check that the Meter is vertical (within +/- 0.5 degrees).
2. Draw 16.0 L of test liquid through the Milk Meter, close the inlet tube valve.
3. Read the scale on the Milk Meter flask. The result should be 16.0-17.0 kg (16.5 ± 3%).
4. Empty the Milk Meter.
5. Once the Milk Meter is empty, close the vacuum valve, remove the Milk Meter from the rig, and open the inlet tube valve.

Repeat the test for each Milk Meter.

Further checks

If the reading for a particular Milk Meter is outside these limits:

1. Check the Milk Meter for air leaks around the cover o-ring, flask gasket, air admission valve and the sampling valve at the base of the Milk Meter.
2. Check the Milk Meter cover and sampling nozzle for damage and obstructions (e.g. hair, grit). Replace these components if necessary, or remove any obstructions.
3. Repeat the test.

If, after this, a particular Milk Meter measurement does not fall within the range of 16.0-17.0 kg, disassemble and check the Milk Meter, then reassemble and test it again.

Servicing required

If a Milk Meter reading is still inaccurate, send the faulty Milk Meter sent to a Tru-Test Service Centre for repair.

Testing repaired Milk Meters

Where a measuring nozzle has been replaced on the Milk Meter, the Meter must be checked for accuracy using the test methods described above.

Test date label

When a Milk Meter has been tested, a "Test date" label must be affixed to the Milk Meter. This verifies that the Milk Meter has been tested and indicates the date the test was done. The label is colour coded by year, with the months of the year around the perimeter. Affix a label to the Milk Meter body with the number of the month of test (e.g. March=3, November=11) at the top of the Milk Meter. The Milk Meter must be tested within 12 months of the date shown.

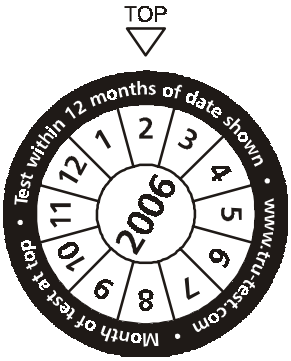


Figure 2. Example shows next test due: February 2007.

VMS SYSTEM DELAVAL

Periodic check of milk meter MM25

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:

- 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.
- 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.
- Check of vacuum level. The vacuum level in turn has a direct bearing on the air flow through the system.

  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:

1. 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).
2. Measure the vacuum level. Note the reference value on the test form.
3. Run a system cleaning.
4. Note the reference date and the serial number of the test probe on the test form.

5. Go to "Test using the test probe" below.

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

1. 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.
2. 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.
3. 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.
4. Measure the vacuum level. The current value must not deviate more than 2.5 kPa from the reference value.
5. 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.
6. 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.

Test using the test probe

1. 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.
2. Close the gates of the milking station and put the station in manual mode.
3. On the PC, start Telnet and log on to the milking station as su (super user).
4. Type hardware 7 at the prompt then press the Enter key.
5. Select option 3 then press the Enter key. This will set all meters in technical mode.
6. Disconnect tubes and elbows from the underside of the meters. Check that all meters are clean and dry.
7. 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.
8. 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.
9. 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.
10. 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.
11. Fill in the minimum and maximum flow under Current MinF and Current MaxF respectively on the test form. (See below for the test form.)

12. 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.
13. 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.
14. Repeat steps 10-13 for the remaining meters.
15. When all tests have been performed, mount elbows and refit tubes.
16. Finish by setting all meters in non-technical mode: select option 5 from the main menu in the hardware program.

It the selftest fails:

1. 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.
2. Wait for the result of the selftest.
3. If the selftest once again fails, select option 11 (RECAL one FF) from the main menu in the hardware program.
4. If the selftest despite this fails, replace the meter.

If the test using the test probe fails:

1. 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.
2. Make sure the test probe is clean.
3. Carry out the test once more
4. If the values still lie outside the interval, replace the meter.

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.

PERIODIC CHECKING OF JARS

Frequency of periodic checking at least once in 24 months.

General

- Check on: height, fixing, stand, content, lighting milking stable, readability calibra-tion, acces-sibility and leaking draw-off valves.
- conditions height:
  - 10 kg-line between 120 - 175 cm (preference-height)
  - 10 kg-line lower than 120 cm: sample draw-off valve on minimal 60 cm
  - 10 kg-line lower than 120 cm and draw-off valve lower than 60 cm (measuring glass under wellhead): use of sample taking equipment and mirrors.

Reference value

- Water test: none - see below the principle of the test and evaluation observa-tions/ measuring.
- Check with electronic special - level, the so called protractor: number of measured digits.

Required equipment

- A sucking set
- Electronic weigh-beam/bascule
- Some buckets of sufficient capacity
- Digital protractor (inc. box)
- Calibration standard
- Grab

Testing liquid

- Clean tap water
- No additions

The principle of the test and evaluation observations/measuring

- For new farms:

Water test

- sucking of 5.8 kg water. The results must be: 6 kg +/- 0.1 kg.
- sucking of 12.6 kg water. The result must be: 13 kg +/- 0.2 kg.

- recording of corner in digits with protractor (bottom on 6 kg-line = reference-value).

- Farms for periodical check:
  - recording number of digits with protractor on 6 kg-line (bottom; top on 16 kg).
  - compare number of digits to reference - tolerance +/- 130 digits (90 digits =0.1 kg).
  - check on leaking taps.
  - check air inlet for mixing the milk.

Deviating measuring glazes

When not coming up to this standard, the measuring glass has to be adjusted and again checked.

Replacement of measuring glazes

By numbering the measuring glazes (durable numbers) changing and replacing is easily noticed. In such cases a new water test is carried out.

Reporting of the results

The results of the periodic checking, as well as the interim changes and the checks that go with these changes will be reported to those concerned, among others to the farmer, to the main supplier and to the national milk recording organization.