

MAST-O-TEST™ 2.0

SUB CLINICAL MASTITIS DETECTOR

INSTRUCTIONS FOR USE

1. Introduction

Mastitis – infection of the udder – is one of the most important and costly problems in dairy farming.

Sub clinical mastitis is particularly dangerous and costly. The milk looks normal and the udder or quarter affected appears healthy. Sub clinical mastitis can rapidly evolve into clinical mastitis or can continue at sub clinical levels, affecting milk production, milk quality, and spreading infection to other cows in the herd.

Research carried out over many years has established that the development of sub clinical mastitis is often accompanied by a rise in the level of salt in the milk, which immediately increases its electrical conductivity. Since the discovery of this relationship, electronic methods of detecting sub clinical mastitis have become widely accepted and practiced.

The relationship between milk electrical conductivity and udder health resulted in the development of the MAST-O-TEST™ 2.0.

Simplicity of use, robustness, speed, low power usage, ergonomic design, modern electronic circuitry, visual functionality, wide-scale digital readout for interpreting severity of infections are making of MAST-O-TEST™ 2.0 the reliable daily tool of the discerning dairy farmer.

Increases in milk fat and temperature affect the electrical conductivity of the milk. **This device is equipped with temperature compensation and is suitable for cooled milk testing. Avoid touching the probes with your hands as it can affect the reading. Clean the probes before usage following the cleaning instructions carefully.**

2. Description

MAST-O-TEST™ 2.0 consists of a measurement cup with terminals, electronic unit, switch, and handle. This unit operates on a 3.5V lithium battery not accessible to the user and sufficient to operate more than 50 000 readings. The instrument is made of high impact ABS, resistant to atmospheric conditions, most chemicals, shock, breakage, and not easily wet by milk. The electronic package uses programmed integrated circuits with a wide scale of integration and a high degree of reliability topped by digital display and 4 sets of LED for ease of interpretation of quarter comparison.

The MAST-O-TEST™ 2.0 measuring cup is equipped with two graphite electrodes and one temperature sensor.

The entire instrument is sealed and waterproof, for ease of washing and cleaning.

3. Operation

- Draw the foremilk into the cup (5ml minimum)
- Press the switch
- The measured value is displayed on a scale from 00 to 99
- After 4 seconds the measured value on the display is stabilized and the appropriate LED (red/orange/green light) for the 1st quarter comes on and remains so for 4 seconds.
- After about 8 seconds the unit switches off to save energy.

- Repeat the above operation for each quarter.

After 4 quarters have been tested:

- Press the switch
- All four LED display the result of each quarter
On the digital display, one or more bars corresponding each to a specific quarter will come on if the quarter difference is higher than 15 % in relation to the lowest quarter (indicated by a flashing bar). Should the comparison between quarters not reveal a difference higher than 15 %, the display remains off.
- If after 4 seconds the display shows "LO" the battery is reaching the end of its life and the unit needs to be replaced. You may use the unit after such warning but it is possible that incorrect readings occur.

Before use, ensure that the electrodes are clean. – see chapter 6.

4. Performing the measurements

To obtain the most accurate results from your MAS O TEST™2.0, milk samples ought to be taken correctly.

Use the first drawn foremilk, taken before udder washing, teat manipulation or stripping. This milk shows the greatest difference in conductivity between healthy and suspect quarters. Teat manipulation or samples collected after the foremilk give results unreliable for correct interpretation.

Perform all four measurements for one udder within 60 seconds.

Hold the measurement cup under any teat and squirt milk directly into the cup. The front edge of the cup can be used to **inspect the milk for clots** (clinical mastitis) etc. A minimum of 5 ml of **foremilk** is required (a ridge in the cup indicates the required level) for the most accurate readings to be taken.

Perform the test as explained in chapter 3.

When used repetitively, rinsing between quarters or between cows is not usually necessary. Milk does not wet or stick to the ABS cup and any minute droplets remaining after a shake are too insignificant to materially affect the next reading.

Rinsing with water is only necessary when the detector is not in use, to prevent milk fat drying on the terminals.

Quarter samples with readings showing conductivity increase higher than **15 percent than the lowest reading** are an indication of development of sub-clinical and/or clinical mastitis in other words, the probability that you are dealing with INFECTED QUARTER(S) is very high.

Important

- We strongly recommend confirming abnormal readings by repeating them after 24 hours.
- Note your results and keep your records updated.

❑ **Testing frequency**

Testing frequency depends on milking frequency and herd monitoring program. In practice the following schedule is advisable:

- Check animals at the beginning of lactation once per week, it is possible to test the milk after calving.
- Check all animals at the middle of lactation monthly and compare the readings with the cell counts from the laboratory analysis.
- Check all animals at the end of the lactation period weekly, especially before drying off the animal.

❑ **Dry off only healthy udders!**

❑ **Consult your Veterinarian!**

Should your herd be affected with recurrent mastitis problems we suggest more frequent analysis of conductivity in all animals. Perform the test for 3 to 4 successive milkings and compare the results. At each test, record your results for individual animals and compile to determine any herd trends. More frequency enables more accuracy; a single test may not detect infection due to variations in bacteria and conductivity.

Absent or dry quarter

Should four measurements for a single animal be impossible to perform (e.g. dry quarter or mastectomy), store a reading equal or close to zero (00 – with no milk in the test cup) instead of the unavailable quarter. The MAST O TEST™2.0 will not use this reading for the quarter analysis. Only readings higher than 25 are recognized as valid readings.

Press the switch once without milk in the test cup (so as to store the reading of the “absent” quarter) and this reading will be left out from the ensuing analysis.

5. Interpretation of results

Relation between conductivity and somatic cell count

There is a strong relation between the electrical conductivity of the foremilk and its lactose and salt content. Illness not related to the udder, problems in metabolism, changes in diet, breed, stress and the stage of lactation influence the conductivity whilst having a lesser influence on somatic cell count. **Conductivity readings are not a measure of somatic cell count.** Both are associated with the presence of infection but only a general correlation exists between them.

The individual quarter conductivity values are specific to the animal under test. As indication of sub-clinical mastitis prevalence, the herd may be monitored by testing all animals with MAST O TEST™2.0. Research has shown that, correct diagnosis of infection will be obtained for 70 - 80 % of quarters after the first test.

Studies of milk electrical properties and mastitis indicate there is no fixed point or number where mastitis is definitely present, or not present. Rather, there are increasing or decreasing degrees of infection as conductivity changes.

The MAST-O-TEST™2.0 sub clinical mastitis detector measures electrical conductivity and higher readings on the display indicate increasing conductivity. This suggests that more salt is present in the milk and therefore the severity of sub clinical infection is likely to be higher.

a) Readings below 54 units:

The milk sample is of high quality and is healthy. The incidence of sub clinical mastitis is very low, typically less than 200,000 somatic cells per ml. (average: 150000 cells). The **green light** switches on.

b) Readings between 54 and 70 units:

A progressively increasing incidence of sub clinical infection as readings increase, with somatic cells present typically rising from less than 200,000 per ml towards 700,000 cells per ml (average: 400 000 cells). The **orange light** switches on.

c) Readings above 70 units:

This is an indication of a rapid increase in the severity of infection as sub clinical mastitis is likely to be established. This is typified by somatic cells present rising from less than 1 million up to many millions. The red light switches on.

The point or reading below which treatment of the infected or injured quarter is required cannot be defined precisely and is also determined by farmer (or veterinary) choice. Quarters showing readings of 54 units or more should be regularly monitored, as any rapid increase in reading is an indication of increasing infection or of mechanical injury occurring.

Older cows (e.g. 9 years or older) physiologically have increased levels of salt in their milk and conductivity measurements typically read values around 54 to 70 units (yellow light) even though the milk is of high quality. Once more, it is important to measure milk from all four quarters to detect a possible infection by differential analysis. MAST O TEST™ 2.0 performs such differential analysis automatically (see chapter 3).

In herds where a large number of cows have milk samples above 70 units a mechanical check of the milking machine by a specialist is advised as widespread high readings throughout the herd may indicate over-milking.

Milk from quarters affected by clinical mastitis may show conductivity readings lower or identical to those of healthy quarters. Clinical mastitis is usually easy to diagnose as it is characterized by milk abnormalities (clots) and the infected quarter may show clinical symptoms such as increased temperature, redness, sensitivity and swelling.

Cows with visible clinical mastitis may return a reading below 54 units because of essential changes occurring in severely infected milk.

6. Care and cleaning

The MAST-O-TEST™2.0 sub clinical mastitis detector is a highly sensitive electronic instrument designed to measure very small changes in electrical conductivity accurately.

The instrument has been designed for use in the often-hostile environment of the milking parlor and is sufficiently robust, shockproof, and waterproof to resist most **normal** working conditions.

However, as a sensitive electronic instrument, its accuracy is best maintained by keeping it clean and free from injury, physical abuse, extreme temperatures and dust.

Because of the self-purging design of the test cup, there is no need for cleaning the instrument between quarters or between animals. Cleaning and a clear water rinse after each milking of the herd is all that is required.

❑ Important:

Use only the provided soft brush for cleaning or a similar one (no metallic fibre). Clean the test cup and especially the graphite electrodes with the brush and the cleaning solution provided with MAST-O-TEST™2.0 before and after use. Be careful with the temperature sensor in the middle of the bottom of the test cup. Rinse twice with clean water. **Do not use hot water.**

Do not use your finger, a cloth or sharp implements for cleaning.

After the cleaning procedure let the MAST-O-TEST™2.0 dry in the fresh air - **do not dry with a cloth!**

❑ Test the cleanliness of the electrodes in the measuring cup

- Empty the measuring cell and press the switch for about 3 seconds
- If the display shows "CC" the conductivity of the emptied measuring cell is higher than a set value and a cleaning of the measuring cell is recommended. If the display shows "00" the conductivity of the emptied measuring cell is lower than the set value.

7. Battery replacement

Under normal use, power consumption is very low and the lithium battery will last you for more than 50 000 tests after which you should acquire a new tester.

The reason for adopting such method is based on our experience in respect of life expectancy of electronic components and electrodes and the need to ensure accurate and consistent readings. Your MAST O TEST™2.0 will reach the end of its life when “LO” is displayed on the reading panel.

8. Technical data

Battery voltage:	3.6 V
Minimum number of tests:	50 000
Test time:	8 seconds
Temperature compensation ;	automatic NTC, range: 5-45 °C
Limit for dirty cell:	> 1 mS/cm
Limit for red LED:	> 7 mS/cm
Range for yellow LED:	5.4 ... 6.9 mS/cm
Limit for green LED:	< 5.3 mS/cm
Quarter evaluation:	> 15 % in relation to the smallest value (only values > 2.5 mS/cm are accepted)
Measuring range:	0 -12 mS/cm
Weight:	230 grams

9. Warranty

Unless agreed otherwise the warranty period for the complete MAST O TEST™2.0 measuring and controlling system amounts basically to twelve months after date of shipment in accordance with our General Terms and Conditions. This warranty does not cover defects due to fair wear and tear, mechanical damages, improper use and cleaning, readings in excess of 30000. The warranty is subject to the registration of the user with the manufacturer by ways of returning the enclosed warranty card within 2 weeks of purchase.

The transport costs of an instrument submitted for repairs under guarantee is for the user's account. Whilst the manufacturer reserves the right to replace a defective instrument with a new one, this does not constitute a right in the hands of the user.