

Maintain and monitor milking machine function

- Daily checks
- Air admission holes
- Vacuum gauge
- Pulsators
- Receiver jar
- Weekly checks
- Liner condition
- Regulators
- Monthly checks
- Effective reserve
- Cluster slips
- Milking machine technician
- Changing liners

Milking machine equipment has been designed to harvest milk efficiently and maintain healthy teats. Teats are attached to milking machines for 50- 100 hours per lactation.

Machines that are not functioning correctly can contribute to new mastitis infections in three main ways:

- Bacterial carrier.
- Damaging teats and teat ends and reducing the natural defence mechanisms of the teat canal.
- Causing impact of bacterial-laden droplets of milk into the teat canal.

The most common reason for milking machine problems is inadequate routine maintenance of mechanical components and rubberware. A series of regular, systematic checks provides a simple method of finding problems and guiding preventative maintenance.

If more than one person milks in your parlour, it is important to assign these checking tasks to particular people, and ensure that the right person is alerted to any problems that are found or suspected. Daily and weekly checks should be conducted by milking staff as part of their regular list of responsibilities. The monthly checks should be done by the herdowner or manager or another skilled observer.

Recording the results of monthly checks enables subtle changes due to wear and age to be detected more easily.



Typical vacuum levels

Typical vacuum level recommendations are:

High line 48- 50 kPa.

Mid line 46- 48 kPa.

Low line 42- 45 kPa.



6.1 Use daily, weekly and monthly guides to check machine function

Daily checks

- Check the air admission holes (air vents). If the air vent is blocked, the claw bowl fills with milk and leads to more clusters falling off, slow or incomplete milking, and difficulty removing clusters even after the vacuum is cut off. Remove any debris with the probe designed for the task- avoid using drill bits or other tools that may enlarge the holes.
- Read the vacuum gauge. Check to see that the needle reads the same at every milking, i.e. that it aligns with the red pointer during milking and reads zero when the machine is off. If the reading is different to normal, tap on the face of the gauge to ensure that the needle is not sticking.
- Listen to pulsators. The sound of air entering the external airport should be both regular and intermittent. It should be the same sound for all pulsators.
- Watch milk entering the receiver jar. Flow should be even, without flooding or slugging.
- Check cows' teats as clusters come off for any changes e.g. in colour, texture etc.
- Observe cows during milking- unsettled cows may be an indicator of a problem in the environment, or with the machine.

Daily checks	✓
Check air admission holes (air vents)	
Read the vacuum gauge	
Listen to pulsators	
Watch milk entering the receiver jar	
Check teats as clusters come off	
Check cow behaviour	

Weekly checks

- Check for twisted liners. Align marks/arrows on mouthpiece and short milk tube, or place your thumb in each liner.
- Check liner condition, particularly for distortion of the mouth piece lip or holes in the short milk tube. Split liners lead to fluid between the liner and the shell.
- Check filter(s) on pulsator airlines, especially in parlours where the filters are close to the feeders.
- Check drain valves on pulsation airline.
- Listen to the regulator(s). It is normal to hear air being admitted at the regulator. If air is not being admitted it may indicate the machine is leaking air or air is getting in due to careless cluster attachment or cluster fall off.
- Check filters on the vacuum regulator and clean if necessary.
- Check vacuum pump oil level, check oil drop rate.



Jetter washing systems

Preferably use jettors which wash both the inside and outside of the mouthpiece and can be left connected so after washing, the system is sealed. This reduces contamination by milk, muck, dust or flies.



Weekly checks	✓
Check for twisted liners	
Check for liner condition	
Check filters on pulsator airlines	
Check drain valves on pulsator airlines	
Listen to the regulator	
Check regulator filters	
Check vacuum pump oil level	
Check oil drop rate	



Undermilking

Undermilking is best assessed visually or by hand-stripping at least 25% of cows immediately after cluster removal and measuring the volume of milk from each quarter (strip yields).

Undermilking is a problem if more than 20% of the quarters have strip yields of > 100mL.



Maximum milking-out time per cow

If your milking system is functioning correctly, the following figures will apply to about 80% of cows in typical Irish herds:

- 10 L/milking will be milked in 6.3 minutes.
- 12 L/milking will be milked in 7.2 minutes.
- 14 L/milking will be milked in 8.0 minutes.
- 16 L/milking will be milked in 8.8 minutes.
- 18 L/milking will be milked in 9.5 minutes.
- 20 L/milking will be milked in 10.2 minutes.

These figures are based on ICBF data on milk yields and milking duration from Irish milk recorded herds.

Monthly checks

- Check 'effective reserve' and regulator function.
- Effective reserve is an airflow measurement of the spare or reserve pump capacity actually available to maintain the receiver vacuum stable when extra air enters the system during milking.
- All milking systems should have sufficient effective reserve to cover the possibility that at least 1 milking unit might fall off during milking. Larger systems (more than 32 units) should have sufficient reserve to cope with 2 simultaneous falls.
- A simple test to try when the machine is running: open 1 set of clusters (or if more than 32 units, open 2 sets). If the vacuum drops more than 2 kPa, then effective reserve is not adequate. (Note: For milking parlours with less than 14 units, this is not an accurate test). If this suggests a problem, contact your technician.
- During this test, check that the regulator closes or almost closes. The hiss of air entering the regulator should be greatly reduced when the clusters are opened. If this does not happen, check the regulator filter and clean if necessary. If cleaning does not improve the regulator response, call your milking machine technician.
- Measure completeness of milking i.e. undermilking, and milking times.
- If clusters are applied before milk let-down, these average milking times will be extended by approximately one minute.
- Count liner squawks, and slips requiring correction by milker:
 - preferred machine function: no more than five slips per 100 cows
 - machine requires service: more than 10 slips per 100 cows.

Monthly checks	✓
Check effective reserve and regulator function	
Measure completeness of milking and milking times	
Count cluster squawks, and slips	

6.2 Call a milking machine technician if you observe any abnormalities in the parlour during your daily, weekly or monthly checks

Arrange a visit by a technician with a current Irish Milk Quality Co-operative Society (IMQCS) qualification to investigate the problem you have observed and:

- To ensure vacuum levels and airflows are appropriate for machine.
- To check pulsation.
- To service faulty pulsators.
- To correct all faults promptly.

Milk flow simulation trials using artificial teats are the most repeatable way of carrying out assessments. These are specialist tests and should be carried out by trained individuals.

A list of IMQCS qualified technicians is available at www.milkquality.ie. You should receive a full written report on a current IMQCS form from your milking machine technician. CellCheck recommends that milking installations are serviced twice per year.

6.3 Change liners at regular intervals (2,000 milkings or every 6 months)

Cluster liners are designed to flex and squeeze the teat during each pulsation cycle. This is essential to massage the teat and maintain its blood supply. When fitted into a correctly matched cluster, the liner should be stretched 5- 15% more than its original length.

As soon as they start work, liners begin to lose tension, absorb fat and hold bacteria. Once they have been used for too many milkings, the deterioration is sufficient to reduce the speed and completeness of milking, increase teat end damage, and increase the spread of mastitis bacteria.

The effective life of liners is influenced by:

- The characteristics of the materials they are made from.
- The conditions of storage, cleaning and use they experience.
- Their exposure to sun, heat, chemicals and ozone.

Refer to Management Note H

IMQCS milking machine test reports.



Stray Voltage

Stray voltage is often blamed for uneasy cows and high SCC - however having a well bonded machine should rule this out.



Liner Life

Manufacturer’s maximum life for rubber liners is 2,000 cow milkings or six months whichever is first, after which time they should be changed.

When liners are changed, estimate when the next 2,000 cow milkings (or manufacturer’s recommendation) will have occurred, and mark the date to replace liners on your calendar.

Guide to estimating number of days for 2,000 cow milkings

Number of days =

$$\frac{2,000 \times \text{number of milking units}}{\text{herd size} \times \text{number of milkings per day}}$$

For example: A herd of 100 cows [herd size] milking twice per day [number of milkings per day] in a 12 unit swing-over parlour [number of milking units] would take 120 days to reach 2,000 cow milkings.

Number of days =

$$\frac{2,000 \times 12}{100 \times 2} = \frac{24,000}{200}$$

= 120 days