

Beyond The Bucket



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The Impact of Pulsation on the Milking Process

KEY TAKEAWAYS

- Pulsation is vital to milking efficiency, cow comfort, and milk quality.
- Routine pulsation checks by trained technicians help maintain herd health.
- Optimal rate and ratio protect teats and maximize flow.
- Pulsation must work in tandem with liners and vacuums for the system to function properly.
- Improper pulsation settings can lead to teat damage, mastitis, and reduced output.



The Impact of Pulsation on the Milking Process

WHY IS PULSATION SO IMPORTANT IN THE MILKING PROCESS?

In the world of dairy, *efficiency, animal welfare, and milk quality* are all tightly connected—and pulsation in your parlor is one crucial component influencing all three. Although it's a behind-the-scenes function, pulsation is the *heartbeat of the milking process*. In this article, we'll explore what pulsation is, why *rate and ratio* are key, and how it impacts every aspect of milking. We'll also discuss the importance of having your local Cow Care team do regular pulsation checks.

WHAT IS PULSATION?

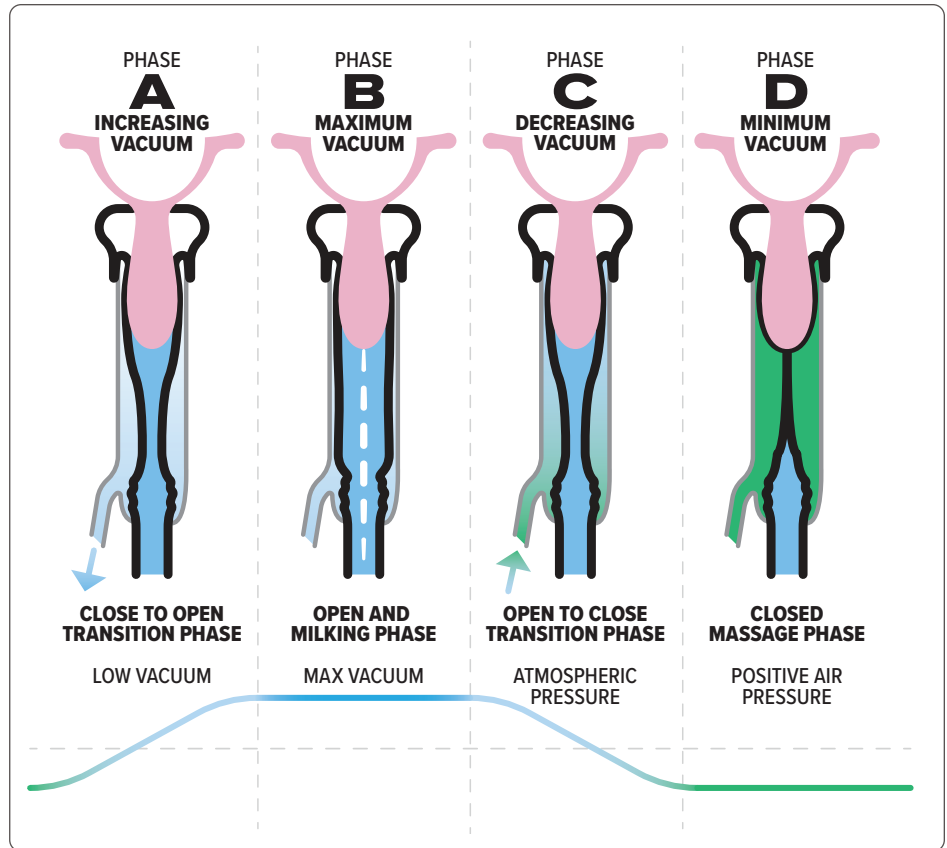
Pulsation refers to the rhythmic opening and closing of the piston or diaphragm in the pulsator. Two key aspects to review regarding pulsation are the rate expressed in BPM (beats per minute) and the ratio, which represents the percentage of time spent in the AB and CD phases.

The pulsation rate is the rate at which it runs through a ratio cycle per minute. For example, a pulsation system reads out at 65 beats per minute (BPM), meaning it cycles through each of the four phases 65 times per minute.

Milking/Vacuum phase (Phase A + B):

The liner is opening phase (A phase) and opened phase (B phase), allowing vacuum to be applied to the teat and milk flows.

- **Description:** During this phase, the liner inside the teat cup is open, allowing the vacuum to be applied directly to the teat. This creates a steady milk flow from the cow's udder. During the A phase, vacuum increases. The A phase is directly related to the length of the short air tube, pulsation hose, and length, and the space between the liner and shells. The B phase is when the liner is fully open and milk is in full flow. The B phase is directly related to the A phase and pulsation rate.
- **Purpose:** To extract milk efficiently while maintaining the cow's comfort.
- **Mechanism:** The vacuum draws milk out of the teat cistern and down into the milk line.



Rest/Massage phase (Phase C + D):

The liner collapses around the teat, relieving vacuum and allowing blood circulation to recover.

- **Description:** In this phase, the liner closes around the teat, cutting off the vacuum and allowing the teat to relax. This massage-like action promotes blood circulation in the teat tissue. The C phase is when the liner is closing and is directly related to the fresh air entering the pulsator. The D phase is the true rest phase or closed phase. D phase is directly related to the C phase and the pulsation rate.
- **Purpose:** To prevent damage or stress to the teat tissue by giving it a chance to recover between milking phases.
- **Mechanism:** Atmospheric air is introduced, collapsing the liner and relieving pressure on the teat.

Pictured above are the four phases of the pulsation cycle. Pulsation rate is the rate at which it runs through a ratio cycle per minute.

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The entire cycle is powered by a pulsator controller, which controls the speed and duration of the liner's opening and closing. Liners are often touted as a primary factor that affects milking, but liners, pulsators, and vacuum go hand in hand. One cannot function properly without the other. In sales, liners are often blamed for residual milk or overmilking; however, if we examine liners without considering equipment functionality and proper take-off set points, we miss the full picture. Often, a slight adjustment in pulsation, vacuum, and milk path will solve the problem.

Proper cow preparation at the beginning of the milking process helps encourage good oxytocin release, which triggers the correct timing for milk letdown. The right combination of pulsation set points is part of successful milking.

PULSATION RATIO

The pulsation ratio describes the relationship between the milking (open) phase and the rest (closed) phase during each pulsation cycle. Most commonly, it's expressed as a ratio, such as 60:40, 70:30, or 65:35. A 60:40 ratio, for example, means that the teat is in the milking phase 60% of the time and in the rest phase 40% of the time during each pulsation cycle. You may ask, why is this important? If the *milking phase is too long*, the teat doesn't get enough time to rest, which can lead to teat end damage and an increased risk of mastitis. If the *rest phase is too long*, milk flow may slow down, reducing efficiency and potentially causing incomplete milking.



Pictured left is a member of our Cow Care team monitoring the pulsation and vacuum of a milking unit. Using this data, they may make adjustments to optimize milking efficiency.

Knowing and maintaining the correct pulsation rate and ratio for your herd and equipment setup ensures a balance between efficient milk out and teat health. When pulsation is properly set:

- Milking is faster and more complete
- Teats get the rest they need, which protects skin integrity and blood flow.
- Cow comfort improves, leading to better letdown and lower stress.
- Teats stay healthier, reducing the risk of hyperkeratosis, irritation, and mastitis.

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Pictured left is a member of our Cow Care team inspecting the pulsators, liners and vacuum to ensure the entire system is functioning properly.

On the other hand, incorrect pulsation can cause slow milking or poor milk flow, all of which result in decreased milking efficiency.

NEXT STEPS AS A PRODUCER

Now that you have been armed with knowledge about pulsation in your parlor feel empowered to ask questions and observe your cows from a different perspective. Proper pulsation is critical for udder health, milk quality, and overall cow comfort. Basic questions to your Cow Care service provider can equip you with the information you need to make informed decisions about your cows and equipment. Ask, “When is pulsation audited on my farm, and what are the results?” Pulsation should be checked monthly or sooner if:

- Cows show signs of teat irritation or damage.
- You notice changes in milk flow rates.
- You’re having issues with incomplete milking or elevated somatic cell counts.
- You’ve recently made changes to your equipment or milking routine.

A trained Cow Care technician can use a testing unit to evaluate the rate, ratio, and overall performance of your pulsators. Regular maintenance can catch failing pulsators before they cause problems in your herd. Additionally, by knowing details of what is happening in your parlor, you will be able to make more informed decisions that impact your bottom line.

FINAL THOUGHTS

Pulsation might not be the flashiest topic in the parlor, but it’s one of the most essential. Knowing your pulsation rate and ratio—and making sure your system is functioning correctly—has a direct impact on cow comfort, milking efficiency, and overall herd health. If you haven’t had your pulsators checked in a while, now’s the time to reach out to our local Cow Care team to schedule a visit. ■



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