Addressing consumer demands for quality milk and animal welfare

The dairy industry continues to evolve towards larger dairies struggling with labour supply, while addressing consumer demands for quality milk and animal welfare. The foundation of any dairy is the milking facility with the results achieved driven by milking performance and efficiency.

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The industry at large has provided numerous new technologies in recent decades to reduce labour through automation, while providing operators with significant volumes of data for herd evaluation. The ever-growing volume of data available has resulted in a trend of optimising the dairy for production, low SCC and genetic parameters.

A serious shortfall exists in optimising the dairy for profit and animal welfare as trends show rising cull and death rates driven by falling SCC levels supported by sexed semen. These trends fail to address the long-term financial sustainability of dairies and run counter to consumer expectations of improving animal welfare with cows enjoying many healthy lactations.

The core of the milking process is the interaction between the teat and the milking machine as that determines flow rate, total time and total yield of milk as well as the health of the teat and udder.

That interaction is controlled by pulsation making the pulsator the effective heartbeat of the milking process with everything else being a means of capturing the milk and directing it to the tank.

The pulsator controls the way in which the liner opens/closes, determines how it interacts with the teat and defines duration of milk and rest phases. The pulsator is fundamentally the most important part of the milking facility and yet the larger industry has made no basic changes to the pulsator since the 1960s.

Even with the evolution of robotic milking along with automated data collection systems the basic technology of pulsation remains as it was prior to the first man walking on the moon.

Technology evolution

In order to understand what technology evolution is required to modernise pulsation it is important to first understand what is required to improve milking performance and efficiency relative to current achievements

Observing high producing cows milking in modern facilities reveals many with slow milking quarters, improper liner attaches, uneven udders, along with quarters not milking out and damaged teat ends/canals.

Industry data shows many cows with SCC

greater than 200K with 70% of a herd in either the first/second lactation. Data shows a trend of rising replacement rates approaching 50%. This all suggests that significant improvements must be made to milking performance and efficiency in order to have herds with most cows achieving five or more lactations with healthy udders that milk as efficiently as the first lactation.

To improve milking performance and efficiency it is necessary to have a milking system that will milk a fifth lactation cow as quickly, consistently and safely as a first lactation cow.

Research shows what is required for every dairy to achieve this higher level of performance and efficiency.

The vacuum required to milk an easy (first lactation) cow is around 10inHg (34kPa), whereas a later lactation cow requires upwards of 16inHg (54kPa). If the facility is operating at only 13inHg (44kPa) then many second and later lactation cows will not milk well and will soon be culled.

Research determined that as the B-phase increases to 800msec and vacuum increases to 16inHg (54kPa) that peak flow rates increase from 8.7lb/min (4kg/min) to 10.4lb/min (4.7kg/min), while time to milk decreases by 20%. The benefit of reduced machine on time is less teat stress, less

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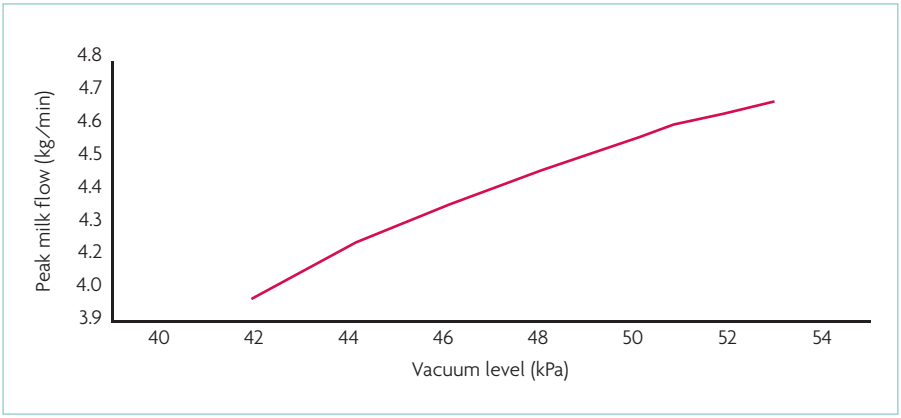
Fig. 1. Peak flow vs. vacuum – higher vacuum yields faster milking.



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labour and optimising the availability of oxytocin release that peaks after two minutes.

This information provides the characteristics required for a pulsator that will achieve consistent milking performance and efficiency for a herd consisting of a uniform mix of first and later lactation cows with healthy udders all milking in a similar manner.

The pulsator must ensure a consistent full attach to the teat, provide proper gentle massage action on the length of the teat (no pinch upon the end) with the system vacuum level of 15inHg or higher.

A rate/ratio of 50ppm at 70/30 achieves the published research parameters of an 800msec B-phase with a minimum D-phase of 150msec.

Cows milked with a pulsator providing these characteristics will be capable of milking in 3.5 minutes with detach settings of 3lb/min yielding low SCC milk from healthy teats and udders as all cows in the herd will enjoy a system optimised for the herd and not just the first lactation.

Industry leader

LR Gehm, LLC has been an industry leader in research/development of advanced pulsation products to move the industry beyond the 1960s technology. This has culminated in the development of a next generation pulsator that incorporates numerous patented technologies providing performance and efficiency not previously achieved.

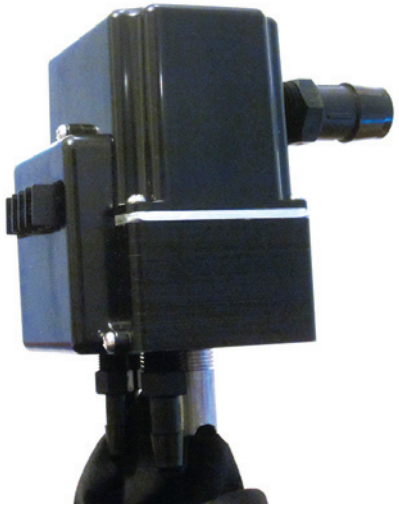
The TridentPulsation product provides performance permitting operation at the optimal rate/ratio with a consistent full teat length massage.

It has four selectable rate/ratios and a feature to hold the liner fully open during attach and detach ensuring both consistent full teat attach and a gentle detach avoiding the typical partial liner attaches that result in poor performance.

The pulsator turns on/off with the detach system, has an integral health monitor to immediately detect a problem and incorporates novel technology to significantly increase operational life while reducing maintenance.

TridentPulsation enables the incorporation of patented PlusPulse technology with a positive pressure fresh air system to allow operation with pulsation hoses up to 14 feet long, while further reducing the need for maintenance.

PlusPulse combined with the innovative air management design of TridentPulsation allows for consistent liner action regardless of vacuum level, while doing so for a fresh liner change as well as liners that are near the end of life.



TridentPulsation is a new pulsation product providing speed, efficiency and reliability to ensure optimal milking action every milking.

This revolutionary combination moves pulsation technology beyond what is available in the industry permitting cows to be milked consistently the same every milking, every day and across every dairy farm.

Other innovative technologies will soon be incorporated to permit functions that do not currently exist in the industry. ■