

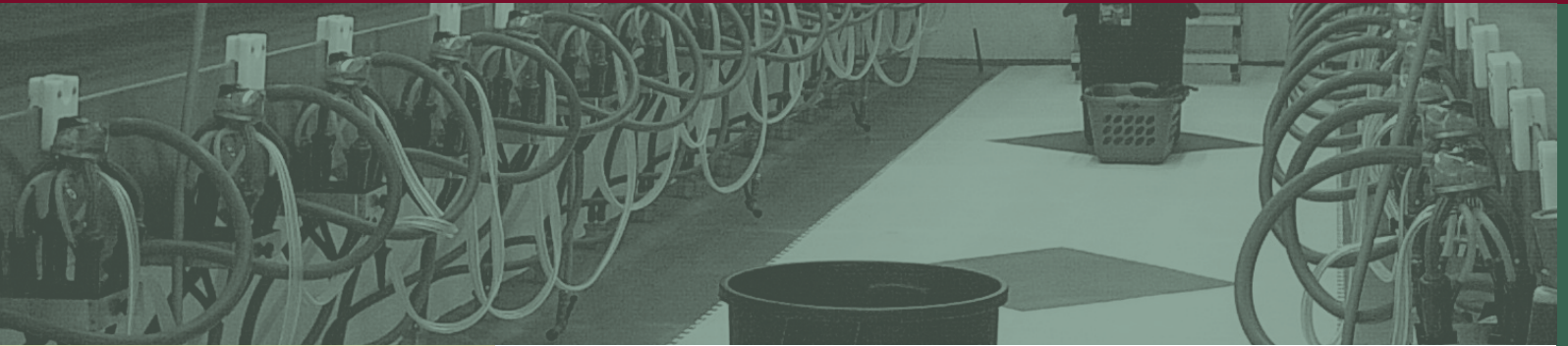
# The Green Liner® File

Promoting healthy dairy products and comfortable cows.



Lauren AgriSystems

[www.laurenagrissystems.com](http://www.laurenagrissystems.com)



## Green Liner:

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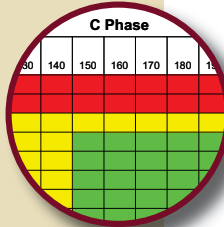
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## We Milk Cows Comfortably!

Lauren AgriSystems is a company committed to continued product and process innovation in the dairy industry with an emphasis on cow health and comfort. What started out as a flooring idea to keep cows comfortable during milking has grown into a methodology of milking cows comfortably!

In the next few pages we invite you to learn about the Lauren Tri-Circle® Silicone Liner, known as the Green Liner®. You will find many details breaking down not only our liner, but what you should be looking for in any liner that you purchase. Pulsation, vacuum, materials, design, system settings all play an important role in the performance of a liner. Lauren AgriSystems has raised the bar on expectations of a liner; you should expect healthy teats, no squawks, and a fast-milking liner – with the Green Liner® those expectations are met!

Lauren AgriSystems has worked hard researching and developing products to make management easier on a dairy. We have added products and conducted research to enhance the performance of the Green Liner®. As we expand our product offerings in

the future we will continue to make new products that will help support one simple phrase, “We milk cows comfortably!”

We ask you to also check out the National Teat Health Database at [www.teathealth.com](http://www.teathealth.com). The NTHDB was established with a simple mission: to give the industry the ability to score and track teat health using a simple and practical methodology already accepted by the industry. NTHDB is an online record system that enables dairymen to track and benchmark teat health, as well as comparing dairies with the same systems, in the same geographic region or with the same breed.

ParlorPro® is another unique resource that not only manages information collected, but also provides benchmarking and analysis tools. It features an easy-to-use interface, paperless handheld compatibility, real-time analysis and instantaneous results. Programs available help manage teat scores, prep procedures, squawks, parlor audits and pulsation monitoring. Learn more at [www.parlorpro.com](http://www.parlorpro.com).



## Material

When designing any product, there is usually a point where one aspect of the design needs to be compromised with another aspect to produce the best product for the customer. That is why we use 3-A approved silicone. We decided that it was better to accommodate the shortcomings of silicone in the design of the Green Liner® and provide the dairyman with healthier cow milking, a cleaner system and better teats. Let's examine the pro's and con's of silicone.

**Tearing** – This is the big issue for silicone liners. But time after time we remove organic liners from a parlor and show the dairyman that 10, 20 or even 40% of their organic liners have tears already. Changing them out in shorter cycles allows these issues to go unnoticed.

By using a ribbed and reinforced short milk tube, we reduce the tearing in liners. In many cases, parlor mats, repairing detachers and attention to procedures can reduce tearing as well as improve the efficiency of the dairy.

**Slow Milking** – The truth here is that there are a lot of slow-milking liners out there and some of them happen to be silicone. Milking speed has more to do with design and system set-up than material. Slow-milking silicone liners generally do not have enough compression on the teat barrel to prevent the congestion that chokes off milk flow. Slow-milking organic liners generally lose their physical properties so quickly that the same thing happens.

The Green Liner® material and the Tri-Circle® barrel are designed to provide consistent and proper massage at the correct vacuum level to milk cows quickly and comfortably.

**Cracking** – Organic liners have been shown to have cracks that grow over time in the surface of the liners. The life of the liner is shortened by these cracks. We have shown that the cracks on the surface of many organic liners are 25 times larger than the allowable surface defects in your milk line or bulk tank! These cracks give various bacteria a safe place to grow, as the cleaning chemicals don't always penetrate all of the cracks.

The silicone surface of the Green Liner® shows no signs of surface cracks over their entire life cycle. This makes the Green Liners® easier to clean.

**Butterfat Absorption** – Butterfat absorption negatively affects the liner's performance.

Silicone has much greater resistance to butterfat absorption than typical organic liners. Typical organic liners absorb 15 to 20 times the amount of butterfat that the Green Liners® do. This is important because the performance of the liner material is affected by the butterfat.

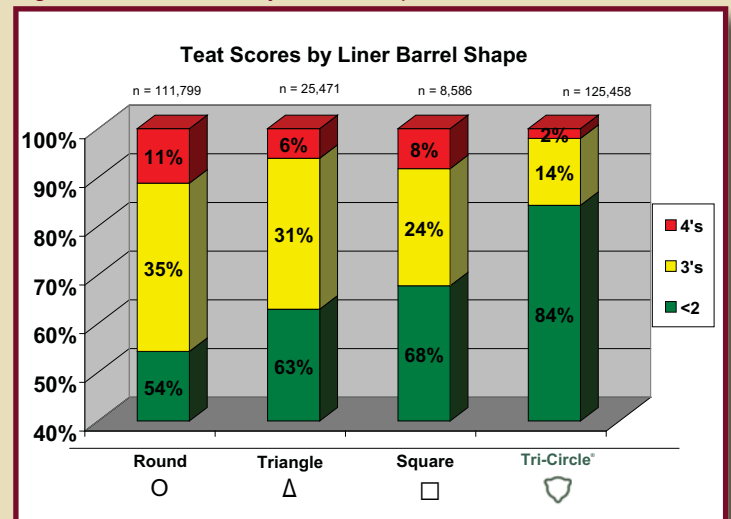


## Tri-Circle® Barrel

**Why does the shape of the barrel on a liner make such a difference?** The answer is simple: The way pressure is distributed across the teat end. Traditional thinking would tell us that a teat is round, so the best shape of a liner barrel would be round. That's not the case. Round liners only close on two planes of the teat, creating a pinching effect on the teat end. As this became more evident, other barrel shapes were created – triangle, square, and Tri-Circle®.

Research has shown that multi-sided liners are better for teat health than the traditional round liners (**Figure 1**). This is due to the way the pressure is distributed across the teat end during the liner closing and closed phases of liner movement. Lauren AgriSystems recognized this function and created a barrel shape that accommodates the teat during the open phase (circular) and during the closed phase (multi-sided).

Figure 1: Teat Scores by Barrel Shape



At Lauren AgriSystems, we know that the Tri-Circle® barrel design of the Green Liner® improves teat ends. We have teat scores from many different herds, throughout the U.S. and Canada, totaling over 300,000 cows. When a dairyman decides he wants to improve his teat health and installs the Green Liners®, the results are usually rapid and dramatic.

So, how do you make a round liner close like a triangle liner? With the Lauren Tri-Circle® barrel design...that's how.



## Touch Point

Touch Point (TP) is one aspect of liner design that has been overlooked for many years. Simply defined, the touch point of a liner describes the level of vacuum needed to close a liner to the point where the walls of the liner touch. It is

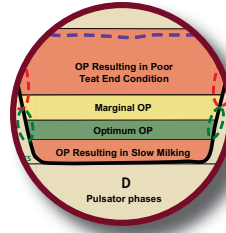
usually measured utilizing a setup that allows someone to look down the barrel and adjust the vacuum or pressure level to the touch point. The value is given in inches of mercury (i.e., A touch point of 4 means it takes 4 inHg to close the liner to the touch point of the walls). The importance of the TP of a liner is that it determines what vacuum is best to use with the liner.

There are several theories that describe the best way to set up a system vacuum based on a specific liner. Most of those theories agree that a minimum amount of force is required to massage a teat, but too much force can cause teat damage. We agree 100%.

Nearly all of the liners on the market today have a TP between 3 and 6 inHg. This has been typical for decades. Liners with TPs in the lower range (below 4), generally work best around 11.5 inHg. Those in the middle range (4-5 inHg), usually milk best in the 12.5 inHg range. The high TP liners (5-6 inHg), milk best up to 13.5 inHg. Any vacuum setting above these guidelines usually ends up with cows having excessive hyperkeratosis. Think of the liner like a pair of vice grips. The excessive vacuum is about the same as tightening the vice grips on the teat end.

The Green Liner® is designed to allow dairymen to take advantage of a higher vacuum setting without giving up cow comfort. The Green Liner®, using the Tri-Circle® barrel design and the physical properties of silicone, has a TP of 9.5 inHg, which is the highest touch point liner on the market today. This means that the Green Liner® needs a higher level of vacuum for the system to work properly with the teat end. The dairyman gets the benefits of the higher vacuum (less machine on-time, higher peak flow) without the negative side effects (poor teat ends, congestion).

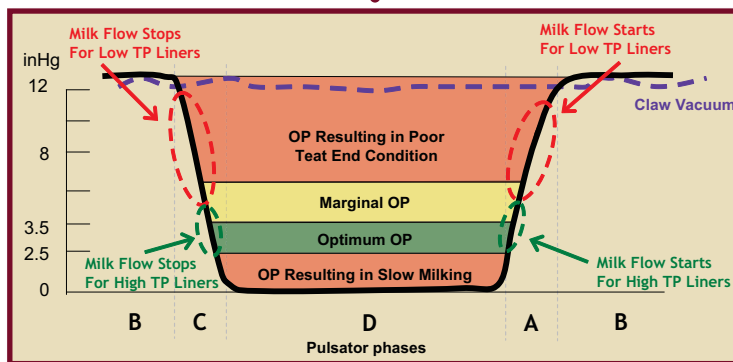
**The result is the fastest-milking silicone liner that delivers the best teat end health in the dairy industry.**



## Liner Compression & Over-Pressure

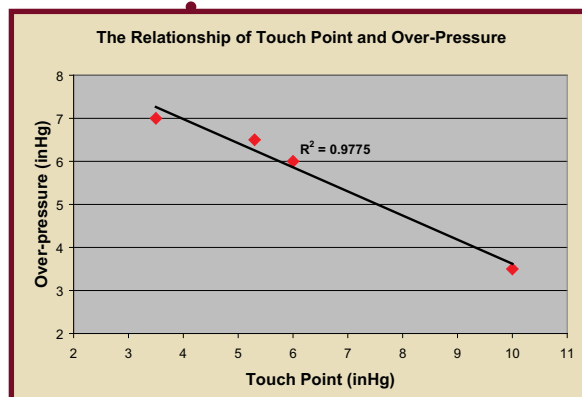
Liner Compression (LC) is another tool that can be used to characterize liners, and is used to describe the force exerted on a teat by a liner through the pulsation cycle. The amount of load applied to the teat during milking has a dramatic affect on milking performance and teat end health. Due to the difficulty in measuring this load, a simpler approach can be taken by measuring the vacuum level in the pulsation chamber when

milk starts and stops. This measurement is referred to as Over-Pressure (OP).



Recommendations have been published suggesting a level of OP that is optimal. Liners operating within a range of 2.5 - 3.5 inHg have shown favorable results on teat end health, and have proven to provide enough relief from milking vacuum to overcome teat congestion

and edema. **The Green Liner® operates at a 3.5 inHg OP.** The high TP (in comparison to other commercially available liners) enables the liner to perform at this level. Factors that affect this are barrel design and material selection. Other commonly used liners operate with a 5.5 - 8.0 inHg OP. In order for these liners to decrease their OP values, they would need to increase wall thickness or durometer or decrease milking vacuum. The result of these actions would likely be a significant drop in milking performance and/or LC that never reaches the teat end.



Achieving the correct LC within a milking system is a balance between liner design characteristics and machine settings. Monitoring teat health, cow behavior, and milking performance are indicators that can be used to judge the effectiveness of a liner. High rates of hyperkeratosis can

mean that there is excessive LC, and slow milking can be an indicator of insufficient LC.



# The GREEN LINER® with the TRI-CIRCLE® BARREL



- HEALTHY TEAT ENDS
- LESS SQUAWKS, FALLOFFS, AND KICKOFFS
- FAST MILKING

3-A Approved  
Silicone Material

Tri-Circle® Barrel

3000 Milkings

Vented

Clean – (No cracks, low  
bacteria growth)

Gentle – (Low Durometer  
and Modulus)

## “THE GREEN LINER®”

The Green® Liner Fits:

## LAUREN 608 SHELL

- COMPLETE SEAL
- NON-TWIST
- BALANCED
- ERGONOMIC



## LAUREN ELITE C PULSATOR

- ADJUSTABLE C PHASE
- QUIET
- FLUSHABLE
- ENERGY EFFICIENT



SIMPLE, ONE-PIECE  
RENEWAL ASSEMBLY





# MORE GREAT PRODUCTS

from Lauren AgriSystems

## Silicone Milk Hose

- 3-A approved silicone
- Promotes cleanliness with no cracking
- Remains flexible
- Maintains physical properties during cold weather



- Sustains a longer life

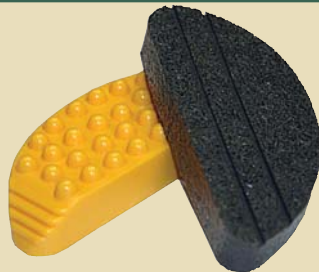
Available Sizes:

Round - 5/8", 3/4"

Tri-Circle - 5/8", 3/4"

## Hoof Blocks

**Plastic** – Long-lasting, skid-resistant design, bright color for visibility throughout barn



**Rubber** – Soft, absorbing, disintegrates in manure systems, skid-resistant

*Note: Highly recommend heating both the hoof and the block (rubber) before adhering glue.*

## C Phase Enhancers

- Adjust C Phase without affecting A Phase
- Allows liner to close slower and softer
- Better teat ends
- Comfortable cows



## Short Air Tubes and Twin Tube

- Advanced material for strength and long life
- Remains soft & flexible
- Will not harden, swell or distort



**THE BEST SHORT AIR TUBE IN THE INDUSTRY!**

Short Air Tubes available in 9/32" inside diameter, 8.5" in length.

Twin Tube available in 9/32" inside diameters.

## CIP Inserts & Jettors

Designed for the Green Liners®

- Adaptable to most CIP trays
- Tighter seal during washing
- Long-lasting silicone material



# WE MILK COWS COMFORTABLY!



Perfecting Parlors With Polymer Products

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 www.teathealth.com  
 www.parlorpro.com



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## Mouthpiece

**So how do we reduce squawks and fall-offs so dramatically?** A common misconception about the Green Liner® is that the increased vacuum reduces the number of squawks and fall-offs. It doesn't hurt, but the design of the mouthpiece has a lot to do with it as well.

The mouthpiece of the Green Liner® is designed to work with the physical properties of the silicone at the appropriate levels of vacuum for the liner. Combine that with a proper vent and you have the right situation to prevent squawks. Don't worry about the mouthpiece wearing out through the longer lifespan of the Green Liner®. Silicone retains physical properties longer than organic rubber.



## Vent

First, let's talk about reality...every unit is vented, most at the claw. Venting is necessary to properly milk a cow and is accomplished by leaking air into the system. A properly functioning vent will allow milk to flow as designed and thus stabilize the vacuum. Most of us can agree that proper venting is a good thing.

Many liner designs have been out for quite a few years. Some have updated their liner to provide a vented and non-vented version, letting the dairyman decide. The ones that do have vents are prone to clogging by manure and other debris. Lauren has a patented vent design that prevents clogging to accommodate the longer life of the Green Liner®.

There are several important reasons to include a vent in a liner. Most importantly, is to get the milk away from the cow. Any liner that wants to milk fast will have to handle high peak flows for extended times. Think of pouring gas from a 5-gallon gas can. If the vent is closed, the flow is restricted by the nozzle and it slows dramatically...open the vent and it will flow freely. The air needed to let the milk flow will come from somewhere – the mouthpiece, the claw or even a hole in the short milk tube. We believe the best way to do this is with a controlled vent in the liner.



## Vacuum

The functions of vacuum are: offset the forces of gravity, seal liner on the teat, withdraw milk from the cow, transport milk in hoses and provide pulsation - open and close the liner. Liners will vary in resistance to collapse; the higher the resistance, the higher vacuum is required for closure and proper teat massage.

NMC, ASAE, and ISO all have the same "suggested" guideline for average claw vacuum under peak flow.

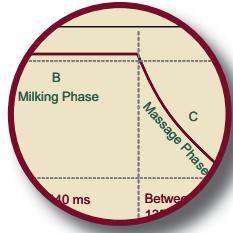
They all state that "An average claw vacuum between 35 and 42 kPa (10.5 inHg and 12.5 inHg) during the peak flow period is **generally considered a desirable level.**" When this guideline was written, all tests and observations had been done with "conventional" liners with touch points (touch point = the vacuum required to bring a liner's walls together to the point of first touch) ranging between 2.5 inHg and 5 inHg. When setting your vacuum you want to be sure you have enough vacuum to close the liner and have enough vacuum left over to provide adequate massage to the teat.

**What should my system vacuum level be?** The answer is "You should set your system vacuum to the liner you are using." Your cows will tell you. You have 10 seconds after unit removal to check teat color. Are their teat ends white to a light pink when the units come off? Any purple or blue color means a lack of compression and may require higher vacuum settings.

**For the Green Liners®:** set system vacuum to achieve average claw vacuum at peak flow of 12 inHg to 13 inHg with less than 3 inHg fluctuation. To achieve this, system vacuum is normally between 14 to 14.6 inHg (low liner parlors only). Lauren's suggested method to measure peak flow is using a 1.5-inch 16-gauge needle inserted into short milk tube about 1.5 inches below liner vent.

Understanding vacuum and its relationship to the liner you're using is just one more attention to detail that helps milk today's high-performance cows more comfortably.

# Pulsation



Pulsation is a key component to milking and the force behind the interaction between your cows and the milking machine. There are a few important elements to know when discussing pulsation: 1) Pulsation is liner wall movement, 2) Pulsator ratio and liner wall movement (see **Figure 2**) are not the same, 3) Pulsation is the function of pulsator rate, and 4) Pulsator phases are the relationship of the pressure changes between the shell and liner as air is evacuated and admitted.

Pulsator phases are the relationship of the pressure changes between the shell and liner as air is evacuated and admitted.

**What is the correct ratio for your dairy?** Your goal should be to get the milk out of every cow as efficiently and as comfortably as possible; which, can be 64/36, 65/35, 68/32, 70/30, etc. The important thing is finding out how your liner is reacting to your pulsation. Vacuum level does play a role in this equation, as each liner does have a specific touch point.

### The four phases of pulsation (see **Figure 3**):

1. A Phase = the opening phase of the liner, milking begins
2. B Phase = the open phase of the liner, the milking phase
3. C Phase = the closing phase of the liner, milking ends
4. D Phase = the closed phase of the liner, no milk

Figure 3: Ratio = (A+B) : (C+D)

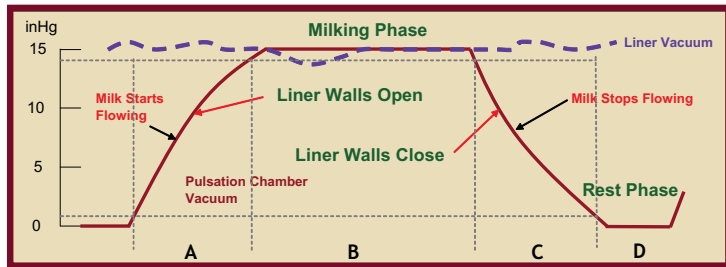
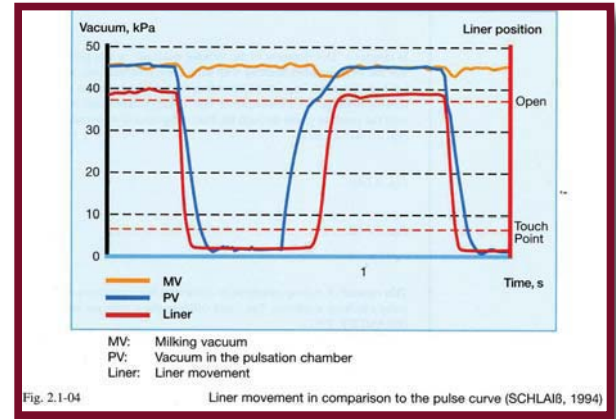


Figure 2: Liner Wall Movement



**For the Green Liner®:** test pulsation with unit under vacuum and with teat plugs in place. Individual phases should be at:  
 A Phase: 120 ms or higher      B Phase: >440 ms  
 C Phase: 135-200 ms              D Phase: 160-200 ms

Recommended Settings for the Green Liner®

| D Phase | C Phase |     |     |     |     |     |     |     |     |     |     |     |     |
|---------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|         | 100     | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 |
| 130     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 140     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 150     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 160     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 170     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 180     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 190     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 200     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 210     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 220     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 230     |         |     |     |     |     |     |     |     |     |     |     |     |     |
| 240     |         |     |     |     |     |     |     |     |     |     |     |     |     |



## Are Green Liners® Right for You?

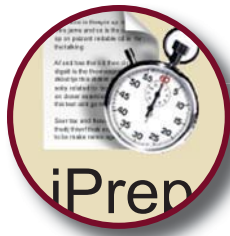
**What should you expect from your liners?** If you have a teat end problem, you need a solution, not another liner off the back of the route truck. Many liner companies have enough liner options that they can keep you tied up for years in a “try it and see” cycle that only helps their sales, not your teat ends.

At Lauren AgriSystems, we break that cycle. We believe every dairyman should expect more from their liners. If your expectations are not being met, then you’re not getting proper service. The following are reasonable questions your liner supplier should be able to answer. If you can’t get the answers to these questions from your current liner supplier...then ask us, we know:

- What will happen to my teat end health, my squawks, falloffs and kickoffs, my milking times?
- What is the touch point of the liner?
- What vacuum level and pulsation settings should the system be set at?

With the Green Liner® you can expect: Better teat end health – Less squawks, falloffs and kickoffs – Fast milking

If you would like to see if the Green Liner® is right for you – visit our website to learn more. Visit [www.laurenagrisystems.com](http://www.laurenagrisystems.com)



## ParlorPro®

ParlorPro® by Lauren AgriSystems was designed for dairy professionals by dairy professionals. With the success of the National Teat Health Database, Lauren AgriSystems saw the need to have a resource available that not only manages information collected on dairies, but also provides benchmarking and analysis tools for professionals who are serious about improving the current state of dairy technology. An online database providing professional reporting, data management, and comparative analysis would facilitate communication in the industry.

- Easy To Use
- Paperless
- Instantaneous Results
- Organized Data
- Adherence to Industry Standards

The website, [www.parlorpro.com](http://www.parlorpro.com), features an easy-to-use interface for entering (or uploading) and managing information for a user representing one dairy or multiple dairies. A real advantage to using ParlorPro® is the ability to collect information on a handheld computer while on the dairy. The information collected on the handheld is then uploaded to the database in one easy step. This eliminates countless hours of transferring information from paper to the computer along with the headaches associated with keeping track of all the paperwork. Real-time analysis is also available on the handheld; dairymen can now have their results in minutes instead of days.

Select Your Dairy: 
Welcome, [\[Sign out\]](#)

Home

iTeat

iPrep

Cleanliness

Audits

Pulsators

Squawks

Calendar

Forum

PDA

Admin

**iTeat**

- Teat scores can be entered into the handheld, uploaded to the database; eliminates hours of typing scores into the computer – real-time results!
- Graphs are automatically created for each dairy
- Benchmarking and comparing options

**Pulsator Analysis**

- Organized data in an easy-to-read format
- Automatic analysis performed which will identify areas of concern and malfunctioning equipment

**iPrep**

- Minimizes time spent calculating prep procedures – provides instant results
- Can be used for multiple milkers

**Parlor Audits**

- Useful in tracking changes to the system
- Ability to compare dairies

**Squawk Counter**

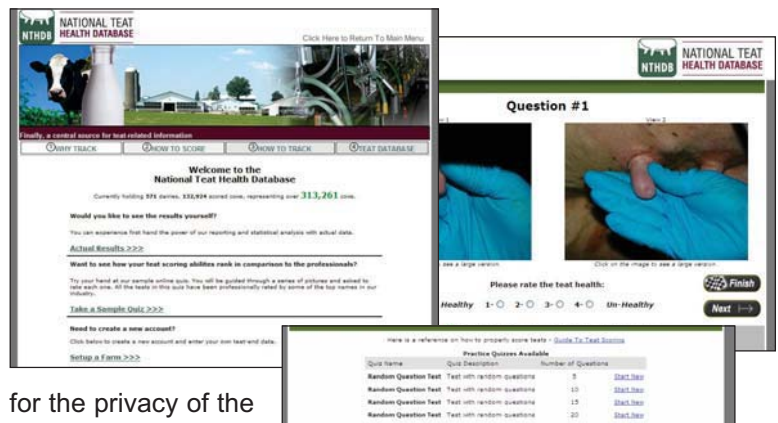
- Runs simultaneously with *iTeat* – simple one-button application



## The National Teat Health Database

The National Teat Health Database is a central resource center dedicated to product and process innovation and is taking teat health scoring to the next level by offering dairymen access to its National Teat Health Database (NTHDB) Located at [www.teathealth.com](http://www.teathealth.com) – the NTHDB is an online record that enables dairymen to track and benchmark teat health and establish best practices by comparing dairies with the same systems, in the same geographic region or with the same breed. All data, such as scores and dairy-specific

information, is password protected for the privacy of the user. The flexibility of the database will accommodate a single user scoring on multiple dairies or a single user on one dairy. To find out more, visit [www.teathealth.com](http://www.teathealth.com)



**NATIONAL TEAT HEALTH DATABASE**

