

Milk Quality On Farm

Oriol Franquesa Oller



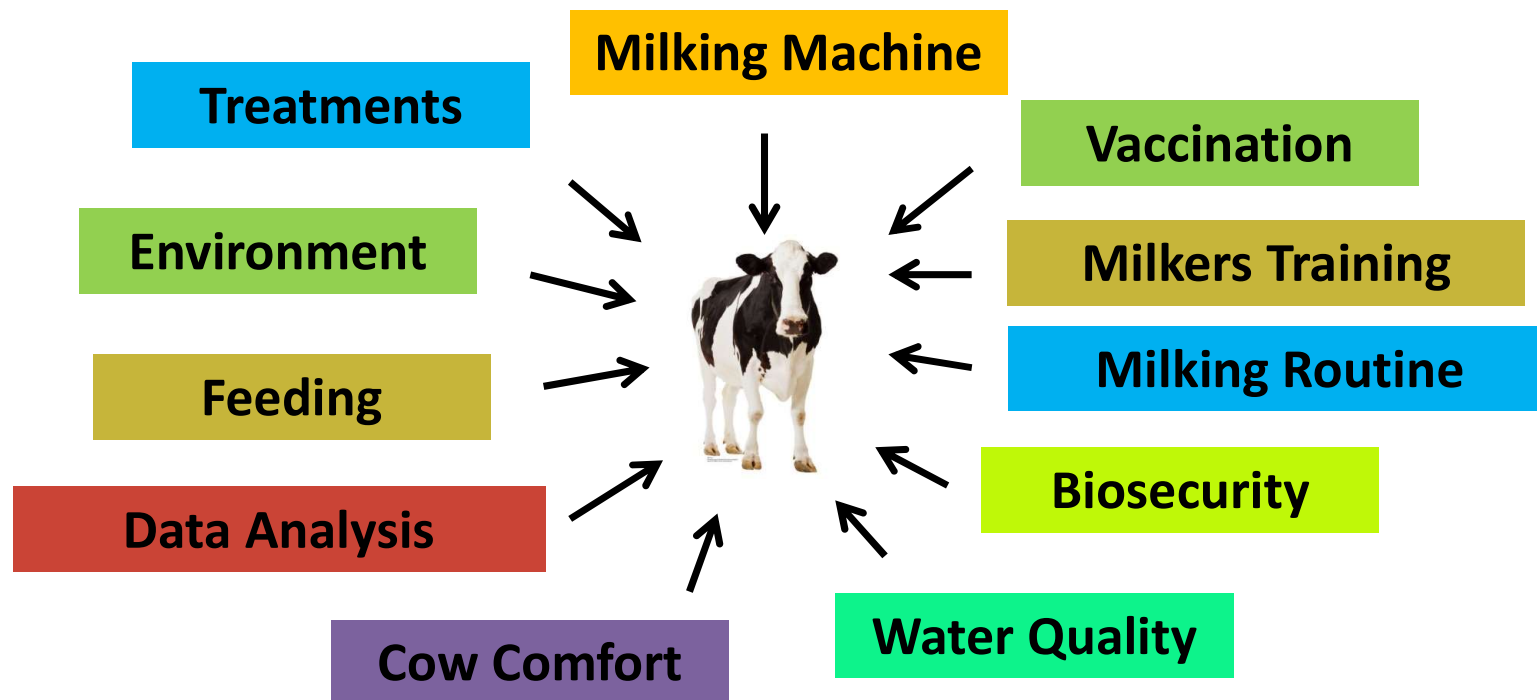
Structure

- MQ basics
- Milking Routine
- Milking Machine
- Environmental evaluation

MQ Basics

- Mastitis is a multifactorial disease
- There is no one single solution. We must work on a **Milk Quality Program**

MQ Basics



MQ Basics

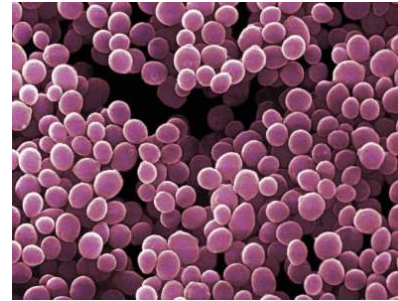
Milk Quality has a very simple basis



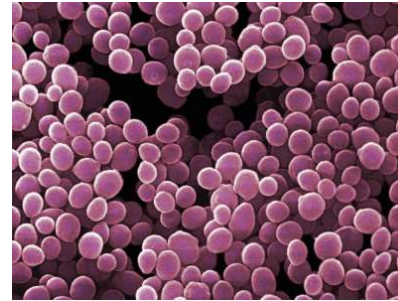
MQ Basics

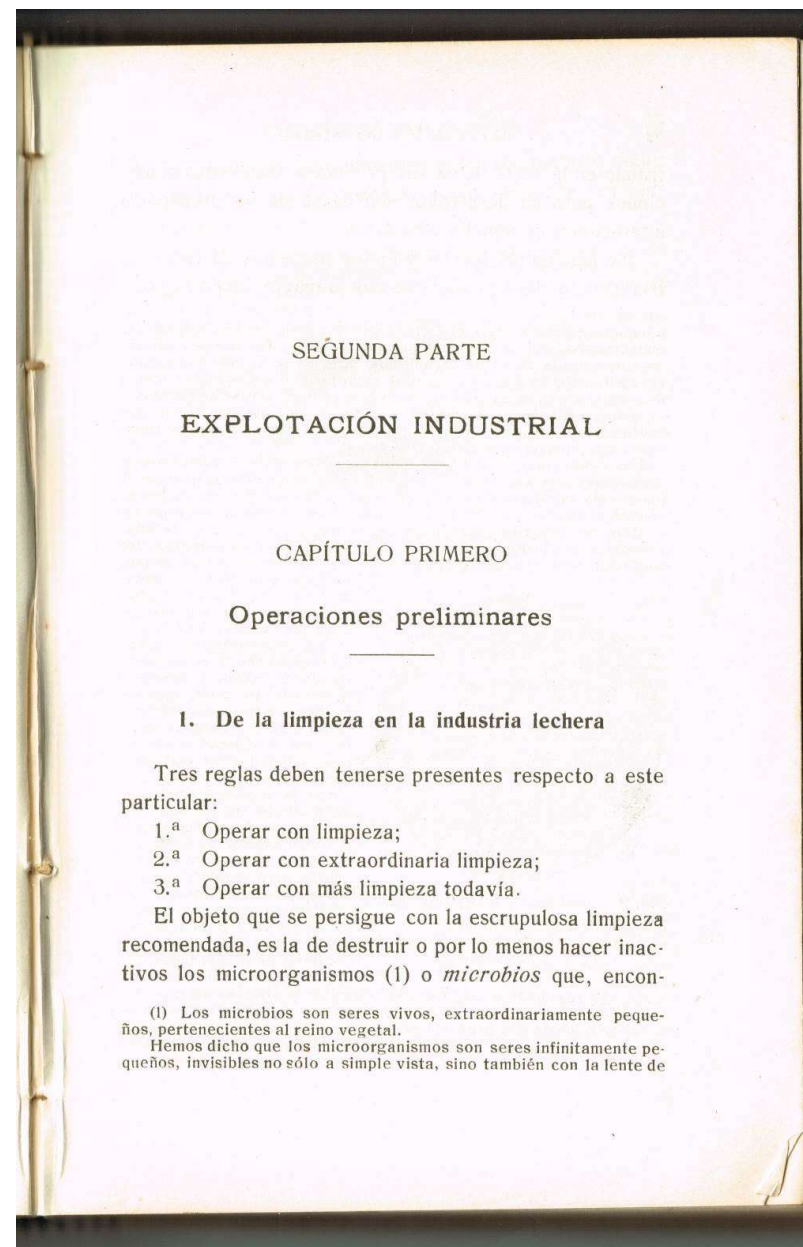
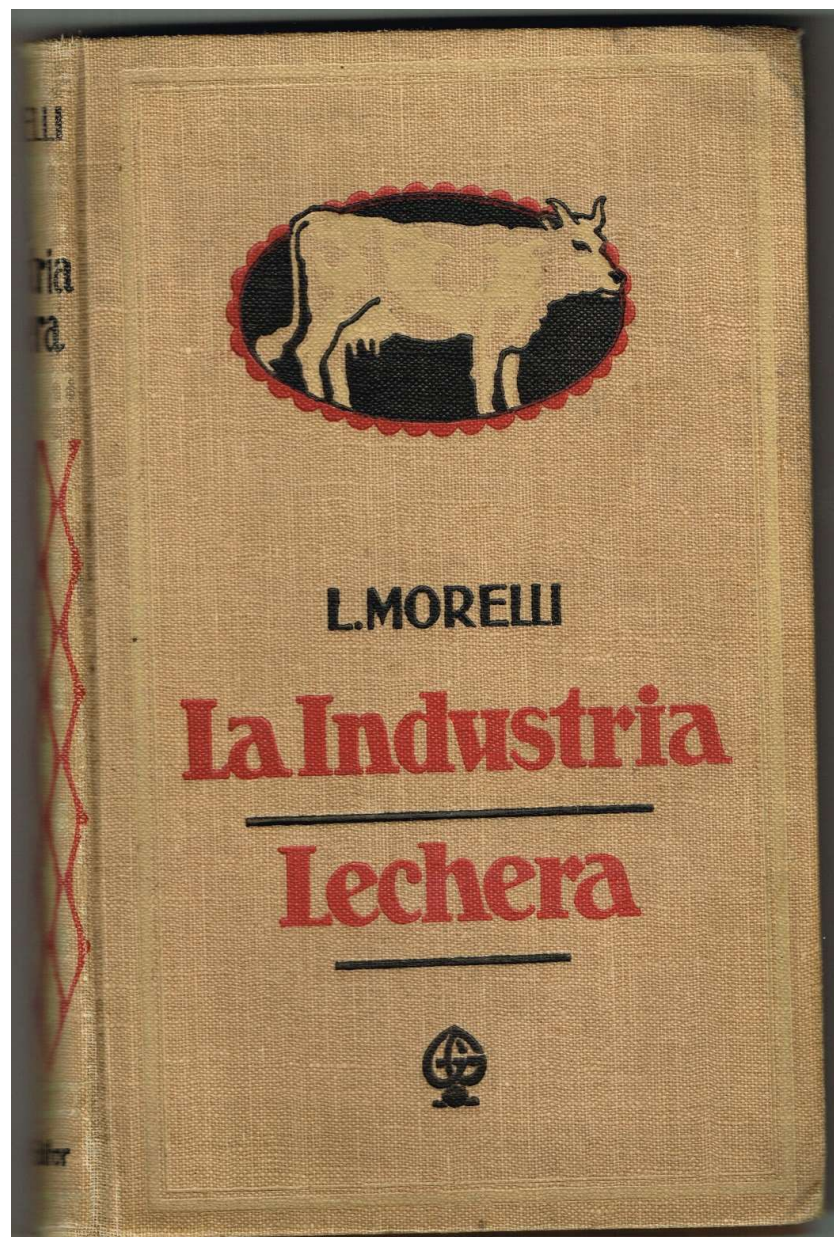


MQ Basics



MQ Basics





Environmental Mastitis Chronology

Environment



M. Routine



M. Machine



Immune System



Treatments

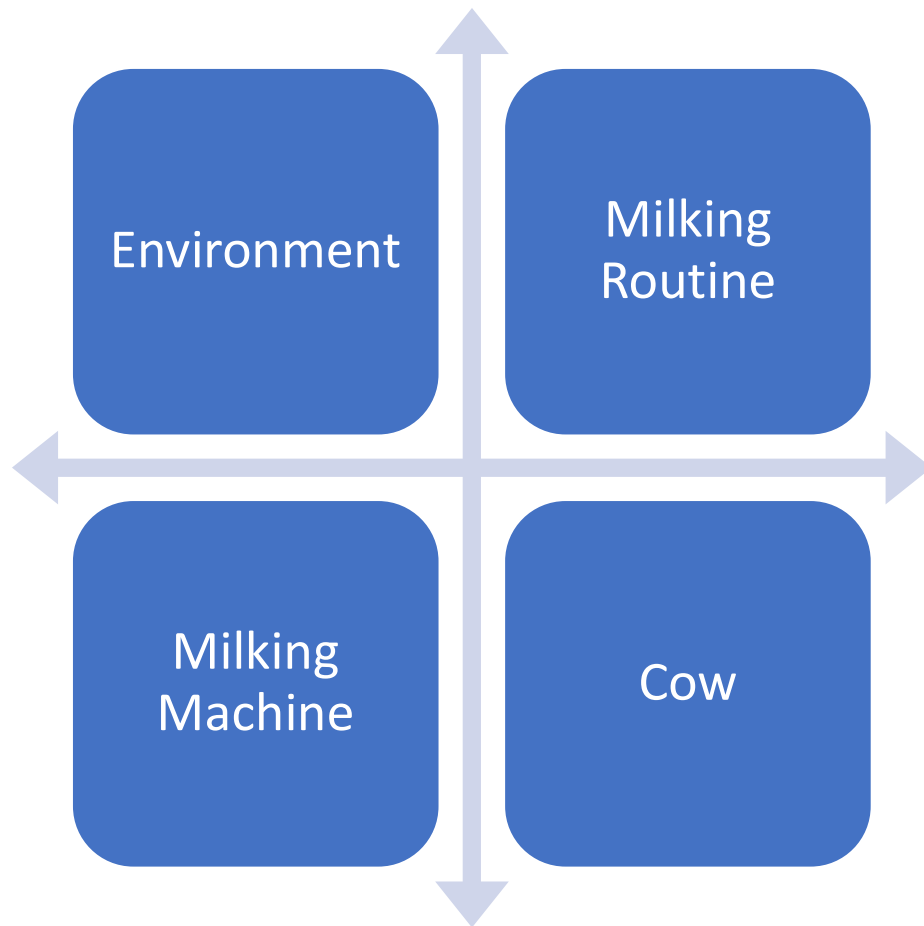


SUCCESS



FAILURE

MQ Basics – 4 main areas



MQ Basics

We work more with people than with cows!

- Organizing labor
- Training on Milk Quality
- Sometimes language is a problem!



MQ Basics

Milk Quality is not a matter of right answers, it is a matter of right questions



MQ Basics

1. Who is our enemy?
2. Where is it living in the farm?
3. How does it get the healthy udder?
4. How do we solve the udder infection?

Milking Routine



Milking Routine

1. Goals
2. Steps and timing
3. Products and tools (paper or clothes)
4. Defining a Milking Routine
5. Training
6. Evaluation

Milking Routine -Goals

What is exactly the goal of the farm?

- Parlor throughput
- Improve milk quality
- To milk with as less people as possible

THEY WANT IT ALL!!!



Milking Routine

Milking has to be:

- Hygienic
- Fast
- Complete

We need:

- Previous cow cleanliness
- Traffic
- Udder preparation
- Milking Machine settings

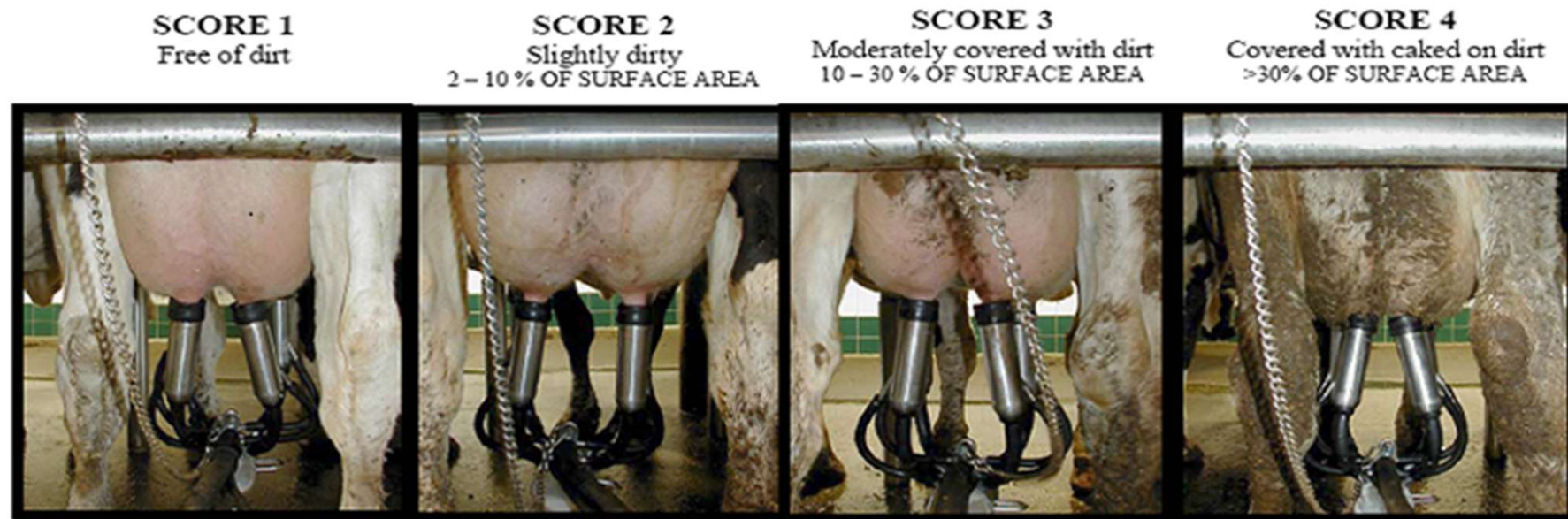
Milking Routine

Milking routine starts before to go to the milking parlor!!



Milking Routine- Previous points

Udder cleanliness at parlor entry



Milking Routine – holding area



Milking Routine- Previous points

Cows management at holding pen

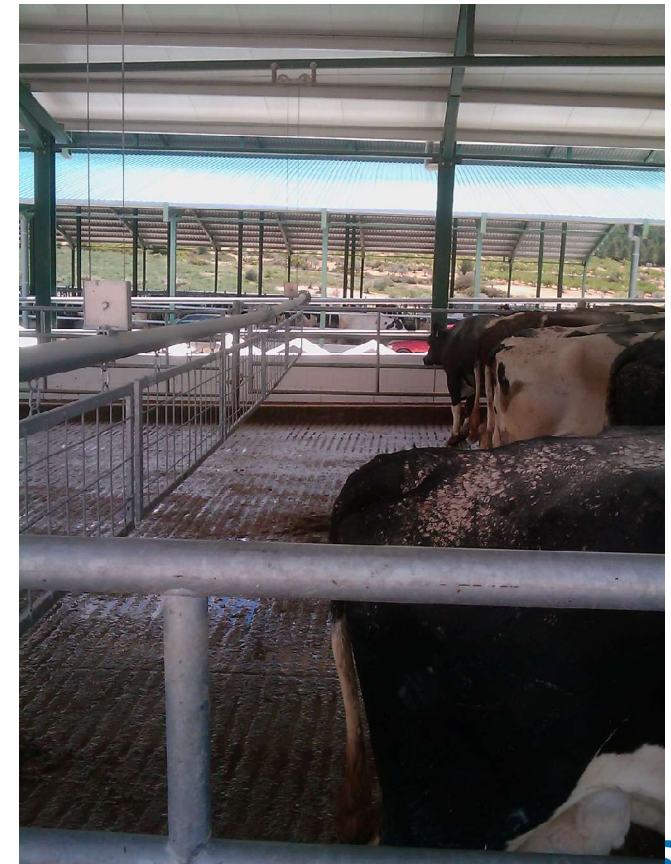




Milking Routine – holding area



Milking Routine – holding area



Milking Routine – holding area



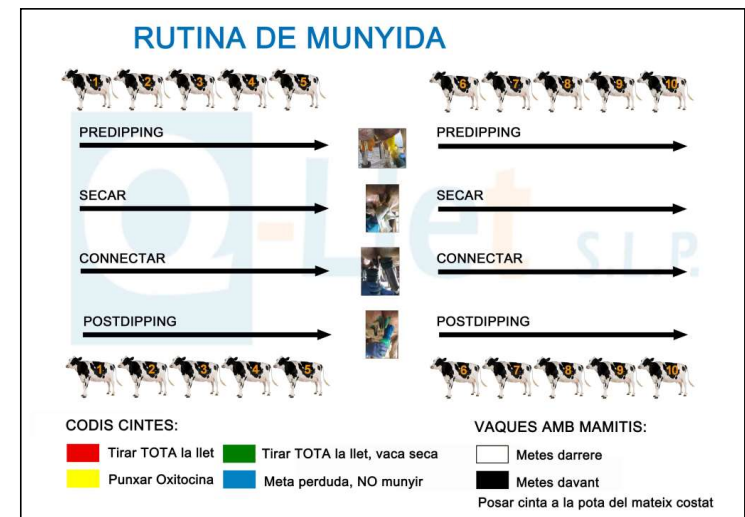
Milking Routine – holding area



Milking Routine -Steps

The characteristics of a good milking routine:

- as simple as possible
- as fast as possible
- consistent and repeteable



Milking Routine - Steps

KISS Principle:

- ✓ **Keep It Simple and Stupid**
- ✓ **Keep It Simple, Stupid**
- ✓ **Keep It Short and Simple**
- ✓ **Keep It Simple and Straightforward**
- ✓ **Keep It Small and Simple**

Milking Routine - Steps

1. Forestrip
2. Predip
3. Wipe or dry
4. Milking Unit Attachment
5. Awareness during milking
6. Postdip

Milking Routine - Forestrip



Milking Routine - Forestrip

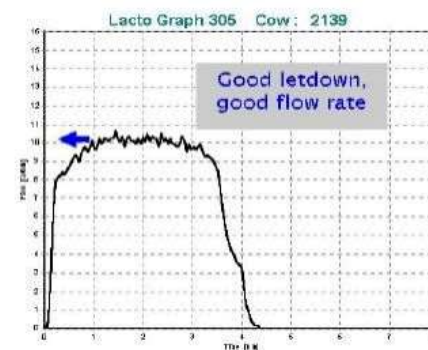


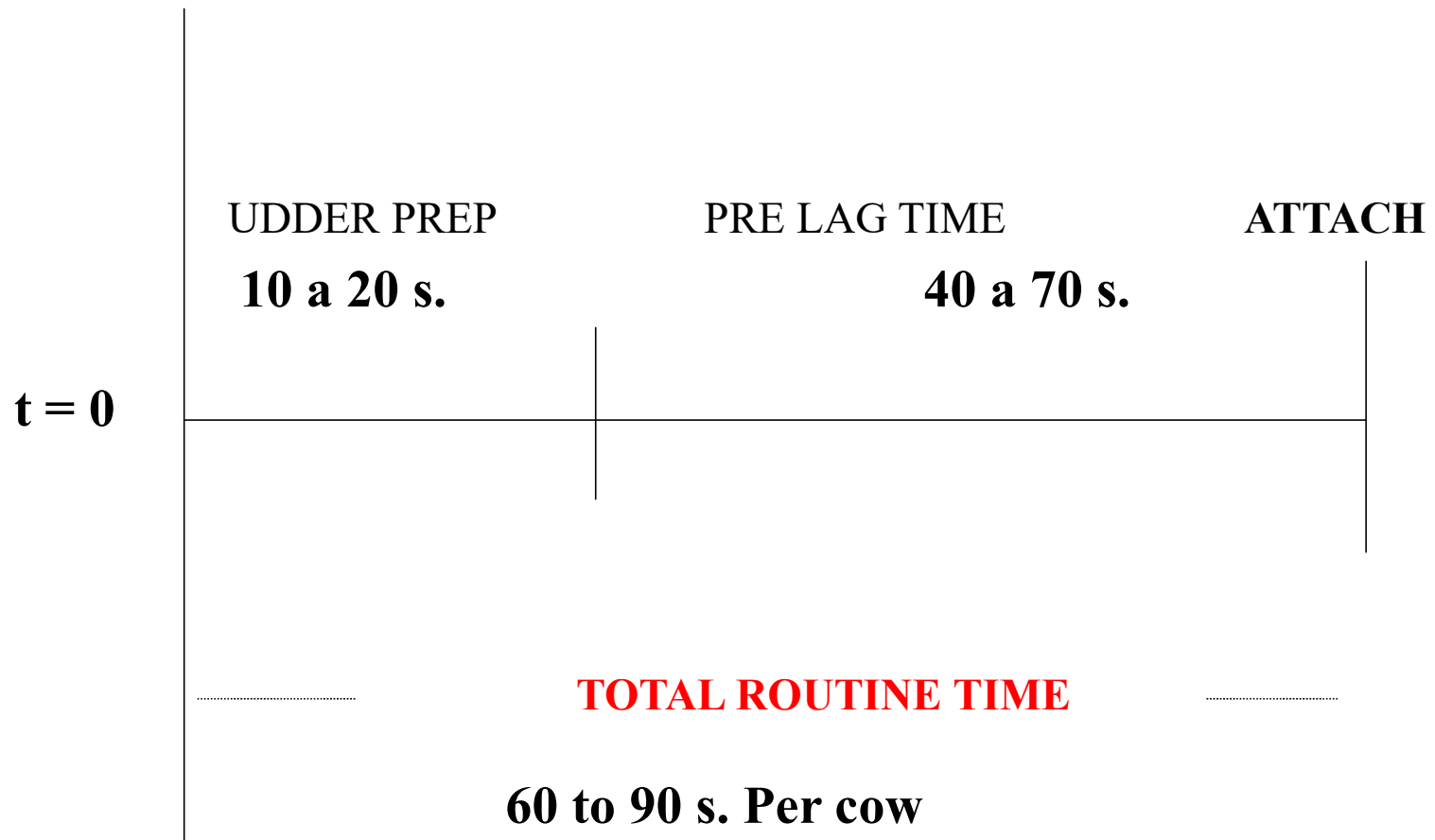
Milking Routine – Why to forestrip

1. Mastitis detection



2. Promote good milk letdown





Milking Routine - Forestrip



Source:
Moez Ayadi, PhD, UAB

Milking Routine - Forestrip



J. Dairy Sci. 95:1170–1176

<http://dx.doi.org/10.3168/jds.2011-4388>

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The effect of premilking udder preparation on Holstein cows milked 3 times daily

R. D. Watters,* N. Schuring,† H. N. Erb,‡ Y. H. Schukken,§ and D. M. Galton*¹

*Department of Animal Science, College of Agriculture and Life Sciences, Cornell University, Ithaca, NY 14853

†GEA Farm Technologies, Naperville, IL 60563

‡Section of Epidemiology, Department of Population Medicine and Diagnostic Sciences, and

§Quality Milk Production Services, Department of Population Medicine and Diagnostic Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853

Milking Routine - Forestrip

Table 4. Incidence of bimodal milk curves in early to mid (EML) and late lactation (LL) cows

Group and lag (s)	Dip + Dry		Dip + Forestrip	
	Total ¹	Bimodal (%)	Total	Bimodal (%)
EML ²				
0	1,261	22 ^a		
60	496	9 ^a	487	9 ^a
90	560	3 ^a	658	5
120	1,142	8 ^a	1,114	6
240	585	13 ^a	662	13 ^a
LL ²				
0	1,035	29 ^a		
60	422	9	493	7
90*	516	18 ^a	457	6
120*	994	15 ^a	995	8
240	487	26 ^a	604	20 ^a

^a $P < 0.05$ compared with dip + forestrip and 90 s of lag time (DF90).

¹Total number of milk curves for each treatment.

²EM and LL differed at $P < 0.001$ compared with DF90.

*Comparisons made within row differ at $P < 0.05$.

Milking Routine - Forestrip

Table 5. Percentage of total milk harvested during the first 2 min of milking unit on-time¹

Lag (s)	EML		LL	
	Dip + Dry	Dip + Forestrip	Dip + Dry	Dip + Forestrip
0	44.0 ^a		44.7 ^a	
60	52.5	55.8 ^a	55.2 ^a	53.1 ^a
90	50.3	51.0	55.9 ^a	61.6
120	51.7	52.8	57.3 ^a	61.3
240	48.0	51.2	57.2 ^a	57.4 ^a

^aComparisons were made against dip + forestrip with 90 s of lag time (DF90) and within stage of lactation, and treatments differed from DF90 at $P < 0.05$.

¹Stage of lactation: EML = early to mid lactation; LL = late lactation.

Milking Routine - Forestrip

Table 1. Milking parlor performance on dairy farms using herringbone and parallel parlors with different pre-milking hygiene routines for 3X milking.								
Parlor size	Herringbone ^c				Parallel			
	Full ^a		Minimal ^b		Full ^a		Minimal ^b	
	Cows /hour	Cows / labor hr	Cows /hour	Cows / labor hr	Cows /hour	Cows / labor hr	Cows /hour	Cows / labor hr
D-20-24	210	70	185	93	217	72	202	101
D-25-29	230	77	252	84	231	58	227	91
D-30-34	—	—	—	—	270	90	280	93
D-35-39	—	—	390	98	280	112	390	130
D-40-44	392	56	408	102	385	96	491	123
D-45-49	—	—	—	—	396	79	528	106
D-50-54	—	—	—	—	460	92	540	108
D-55-59	—	—	—	—	517	103	—	—
D-60	—	—	—	—	497	99	532	107
^a pre-dip, strip, wipe, attach ^b strip and attach or wipe and attach ^c herringbones are parlors with stalls from 34 to 45 inches on center								

*Armstrong, Gamroth and Smith, Proceedings of the 5th Western Dairy Management Conference, 2001

Milking Routine - Forestrip

Should we consider to forestrip or not?

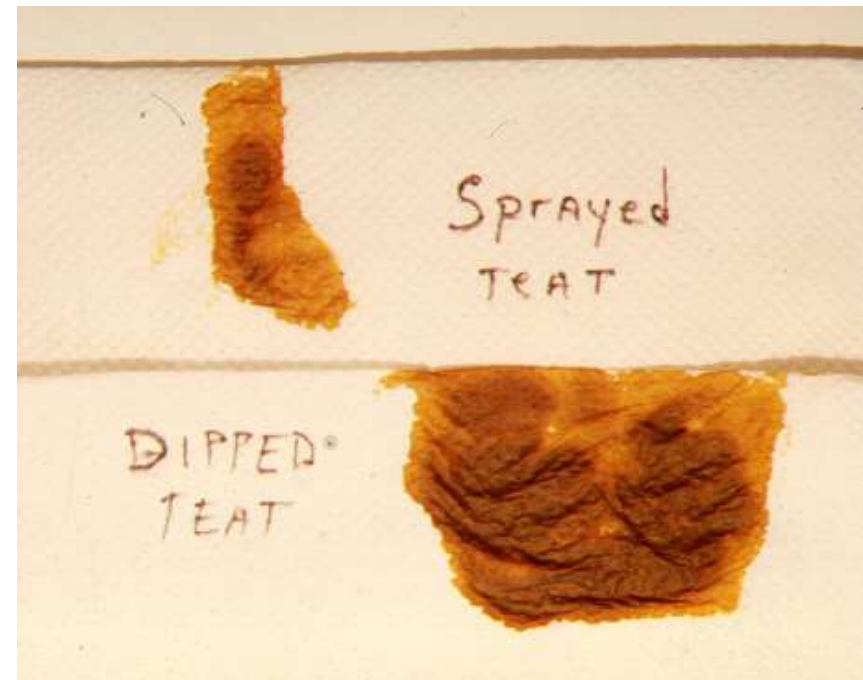
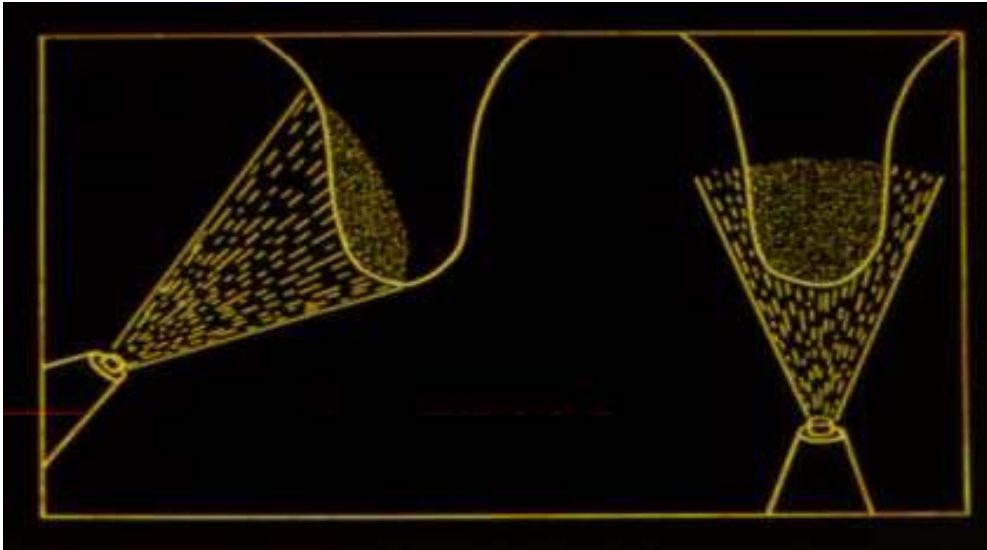
Milking Routine - Predip



01AARQJ2 FLPA | www.diomedica.com

03 Feb 2016

Milking Routine - Predip



Milking Routine - Predip



Milking Routine - Predip

What is the best product for predipping?

- Lactic Acid
- Chlorhexidine
- Iodine
- Hydrogen Peroxide
- Chlorine dioxide
- Hypochlorous acid
- Etc.

Key Points:

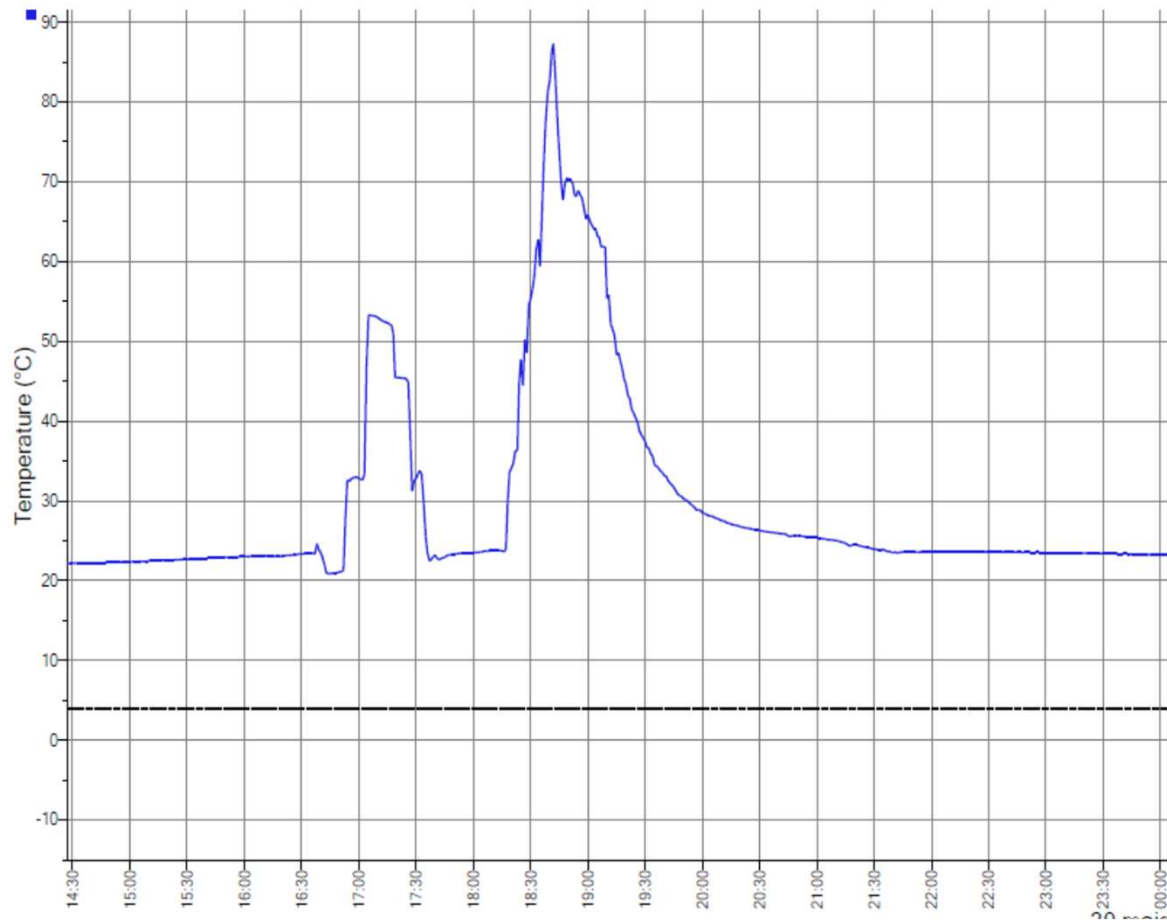
- ✓ How fast
- ✓ Foaming capacity
- ✓ Residues
- ✓ Price?
- ✓ Avoid dilutions...

Milking Routine - Wipe

Towel or paper?



Milking Routine – Towel cleaning



- Washing process at $>70^{\circ}\text{C}$
- Dryer (?)
- Towel bact count (?)

Milking Routine - Wipe



Milking Routine – Unit Attachment

- ✓ Avoid air admittance as much as possible
- ✓ Liners never has to touch the floor



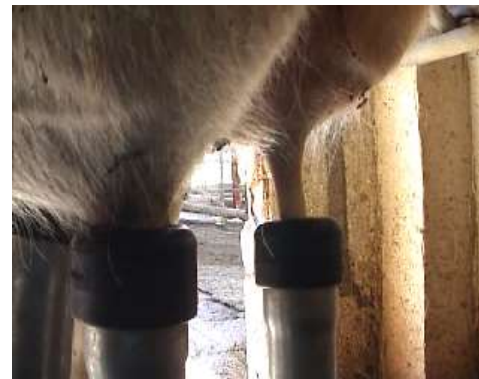
Milking Routine – Unit Attachment



Milking Routine – Liner slips

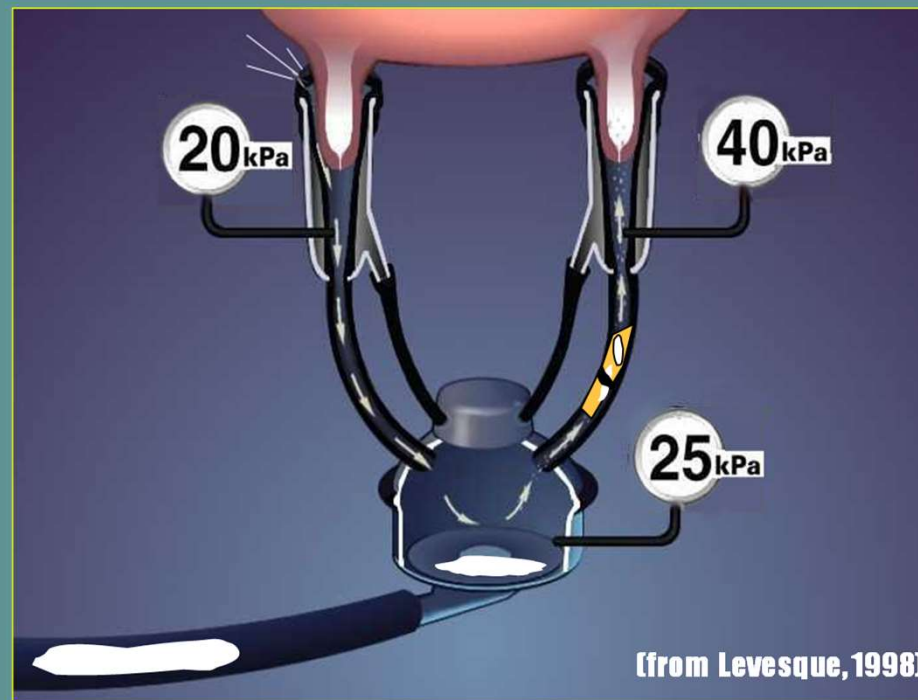


- Liner slips are a major problem for mastitis
- Milk impacts

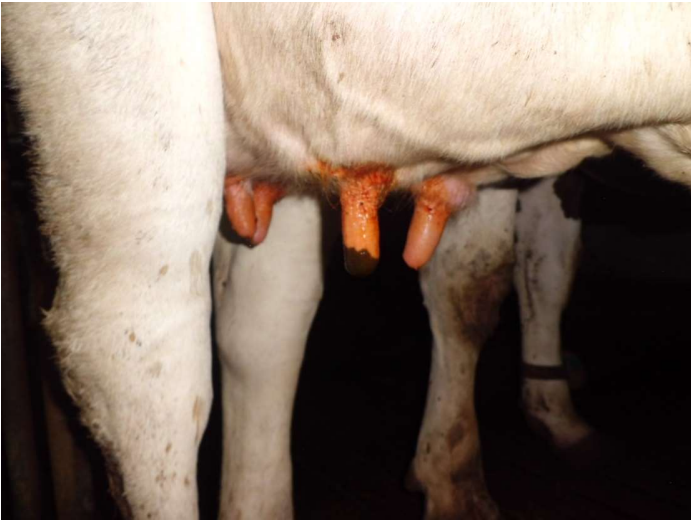


Milking Routine – Liner slips

MILK IMPACTS



Milking Routine – Post dip



- As soon as possible
- We may cover at least $\frac{3}{4}$ of the teat length
- Many different products and presentations
- How thick? Film capacity?

Milking Routine



Milking Routine

What is your Milking Routine?

- Double 12
- Double 16
- Double 20
- Double 30
- Rotary parlor

Milking Routine 2x12

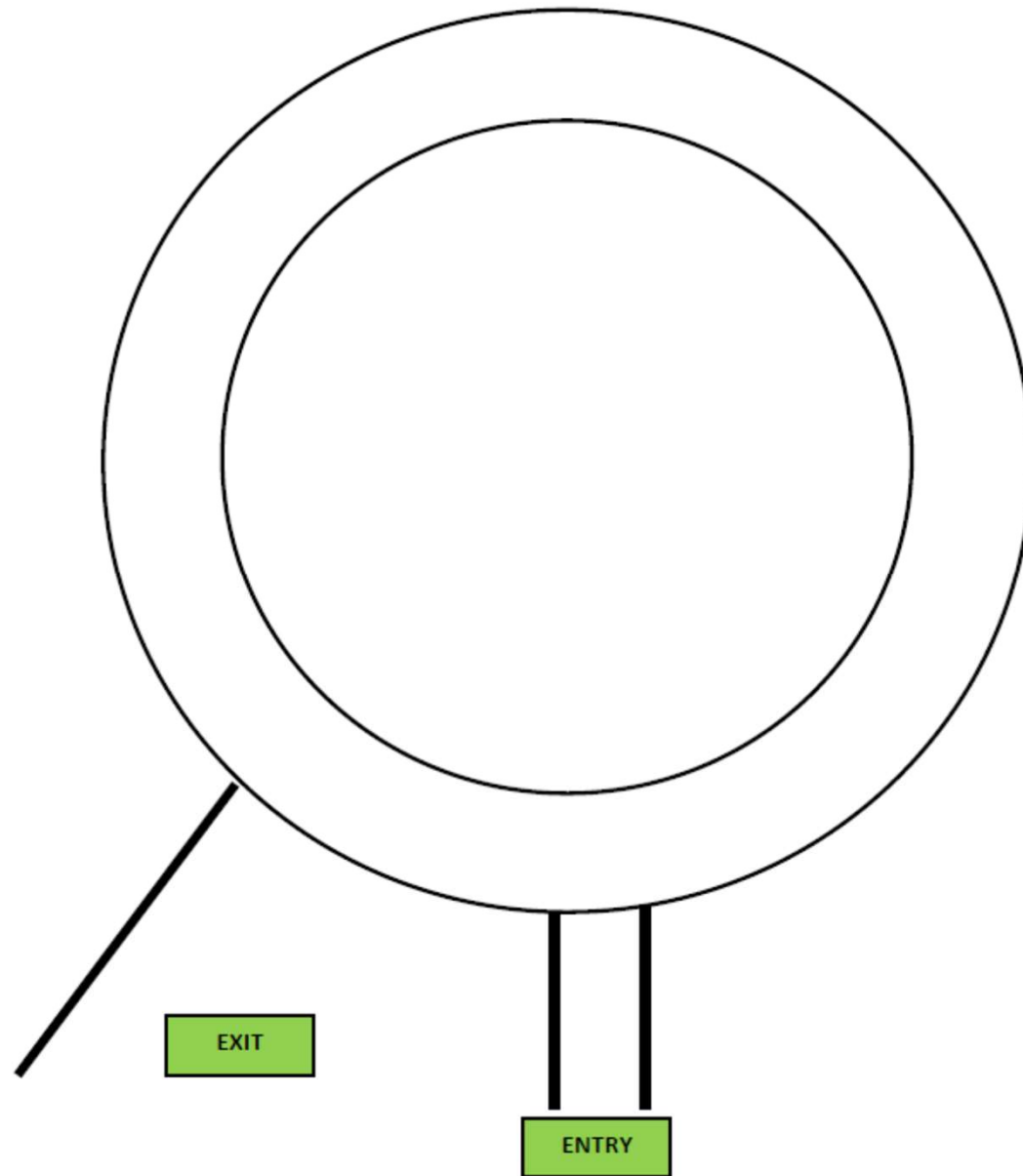
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Milking Routine 2x16

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Milking Routine 2x20

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



Milking Routine - Trainning

Points to consider

- Milker's language
- Milker's skills
- Previous experience with dairy cows

Milking Routine - Training

- Define and use very clear protocols. As simple as possible
- Involve them on protocols development and improvement
- Explain WHAT, HOW, WHO, WHEN. And most important, WHY!
- Use videos, pictures, diagrams.. Whatever you can imagine!
- Use the most experience guys as a translators or mentors

Milking Routine - Trainning



Milking Routine - Trainning



Milking Routine - Training



Certificat de Participació / *Certificado de participación*

En/na: **BAKARY SAHO**

Amb DNI **Y-0000000-A**

de la granja **S.A.T. XXXXXX**, ha assistit al curs **"FORMACIÓ DE MUNYIDORS PER A LA PREVENCIÓ DE MAMITIS I MILLORA DE LA QUALITAT DE LA LLET"** el dia **29 de setembre de 2021** impartit per Oriol Franquesa Oller, veterinari de l'empresa **Qllet slp.**

Assistent;

Responsable formació;



Milking Routine - Training



www.dairycoach.com

Milking Routine - Evaluation



MILKING ROUTINE EVALUATION

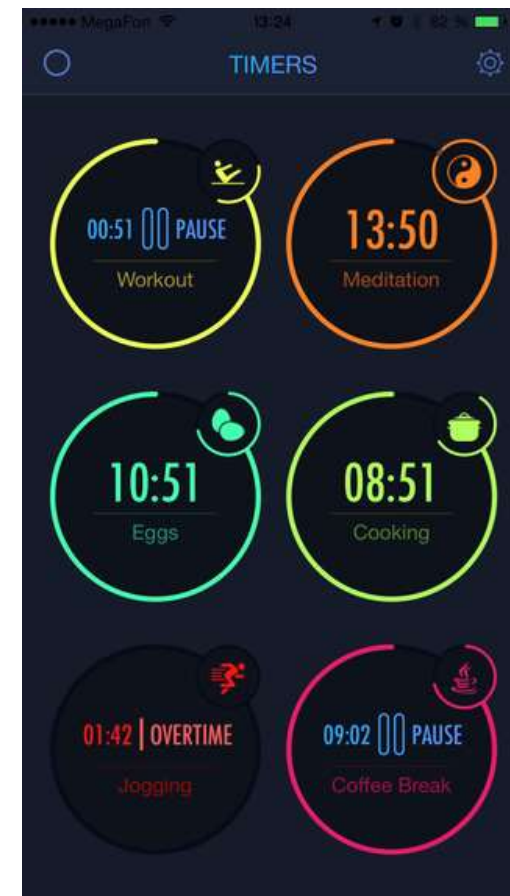
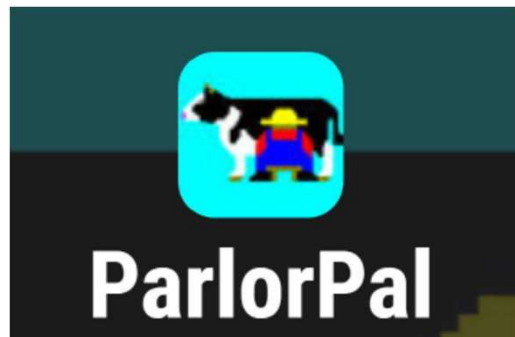
COW	1st action	2nd action	3rd action	4th action	disinfec time	prelag time
ACTION						



MILKING ROUTINE EVALUATION

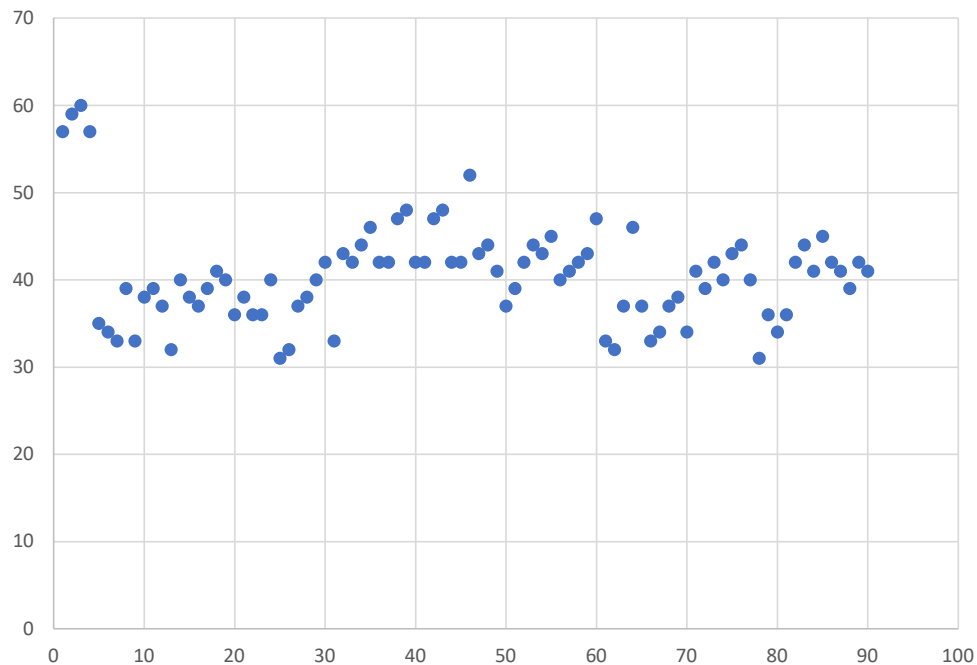
COW	1st acion	2nd action	3rd action	4th action	disinfec time	prelag time
ACTION	Fores/predi	dry	attach			
1	0' 00''	0' 45''	1' 45''		0' 45''	1' 45''
2	0' 07''	0' 54''	1' 55''		0' 47''	1' 48''
3	0' 15''	1' 04''	2' 08''		0' 49''	1' 53''
4	0' 22''	1' 12''	2' 14''		0' 50''	1' 52''
5	0' 30''	1' 25''	2' 23''		0' 55''	1' 53''
6	0' 39''	1' 34''	2' 30''		0' 55''	1' 51''

Milking Routine - Evaluation

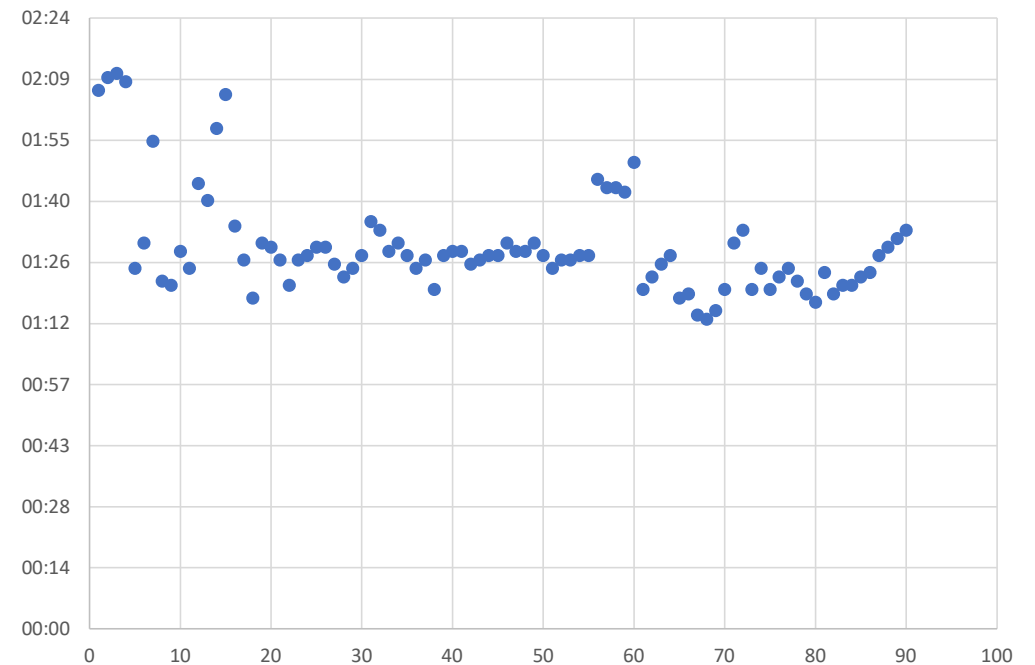


Milking Routine - Evaluation

Disinfection time



Pre lag time



Milking Routine – KPI's

Unit on time		<5 min	>15Kg add 1 min/3Kg
% milk 2min		>50%	45-48 acceptable when high yield
Kg milk 2 min		>6,5 Kg	
Partial Flows		0-15/15-30/ 30-60/ 60-120	
		No especific numbers. Always increasing	
Avg Flow	2X	>3,4 Kg/min	
	3X	>3 Kg/min	
Peak Flow		>5 Kg/min	
Bimodality		<15% (?)	High variation between brands

Atalhos

Lista de pastas

Padrão

Utilities

AfiLab

Sérgio

Luiz

AfiLab

Morivaldo

Fechament

Colostro

Média Leite - Vacas por grupo

Vaca Seca e Maternidade

Rel. Sexta

Ricardo

Sistema do AfiFarm

Hoje

- AfiFarm hoje
- Monitoramento da Sala de O
- Tarefas de Hoje
- Groups Monitoring
- Relatórios de Hoje

Animais

Produção de leite

Saúde

Fertilidade

Estações

- Eficiência da ordenha
- Definir processo
- Relat. de mal funcionamento

Manutenção

Ferramentas Afi

Minha Pasta

- Relat. da Vaca
- Relat. do Touro
- Gráficos do usuário
- Luiz
- Relatórios Gerenciais
- Relat Administrativos
- Sérgio

Home Page

Curva de Ordenha, 16/02/2022 - 16/03/2022 (Updated Last: 17/03/2022 09:56:04)

Projeto Atualizar Adic. na Agenda Visualizar

Legenda Gráfico Tamanho normal

Data	Sessão	Baías de ordenha	Leite/vaca	% Ordenha 2 min.	T.M.O.	Meta TMO	Taxa de fluxo				Tempo de Baix Flux Prelimin	Tempo de Extração Baix Flux	Tempo de baixo fluxo	Bimodalidade de Ordenha
							0 - 15	15 - 30	30 - 60	60 - 120				
16/03/2022	3	2161	13,0	51,1	4,2	4,8	0,81	3,21	3,24	4,04	0,19	0,15	0,34	854
16/03/2022	2	2179	13,8	50,8	4,3	4,9	0,96	3,50	3,57	4,13	0,17	0,18	0,35	933
16/03/2022	1	2180	14,1	45,6	4,2	5,0	0,80	3,25	3,11	3,87	0,18	0,15	0,33	955
15/03/2022	3	2178	12,9	50,5	4,2	4,8	0,85	3,15	3,13	3,97	0,18	0,16	0,34	928
15/03/2022	2	2211	13,4	49,6	4,3	4,9	0,84	3,14	3,15	4,06	0,20	0,15	0,35	973

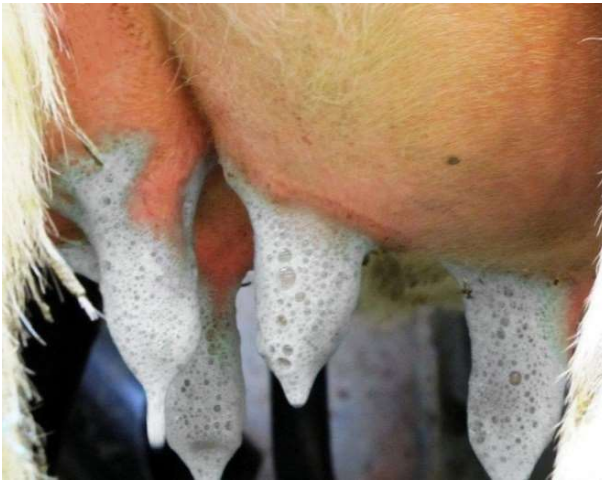
Taxa de fluxo

seg.

DPEvents - [Índices de la performance del ordeño]			
Archivo Ver Datos Ventana Ayuda			
Periodo de evaluación: 20:55 (2 Sep) - 0:00, 3 Sep, 2015			
Totales del ordeño			
Ordeños registrados (animales)	149		
Hora de Entrada/Salida	4:55	7:26	
Duración del turno de ordeño	2 h. 31 min.		
Ordeños por hora	59 /h		
Total de leche	1965 Kg		
Leche por hora	781 Kg/h		
Número de pasadas	17	(14 con más de la mitad completa)	
Duración promedio de la pasada	15 min 55 seg		
Menor/Mayor tiempo por pasada	10 min 54 seg	26 min 19 seg	
Duración promedio para completar un lado de la sala	3 min 05 seg		
Duración promedio desde entrada hasta última colocación		6 min 45 seg	0 min 46 seg / animal
Promedios por animal			
Duración promedio: ordeñando / no ordeñando	5 min 18 seg (34%)	10 min 14 seg (66%)	
Producción de leche promedio	13.2 Kg		
Flujos de leche 0-30 segundos / 30-60 segundos	2.4 Kg/min	2.6 Kg/min	
Flujos de leche 60-120 segundos / Flujo de leche prom.		3.4 Kg/min	2.9 Kg/min
Bimodalidad	26%		
Situaciones especiales			
Pasadas incompletas	3		
Vueltos a colocar	3		
Retirado automático detenido	3		
Leche separada	1		
Preparado			
		CAP	NUM

Milking Routine - Evaluation

- 3M Cleantrace



Milking Routine - Evaluation

- Swabs from the teat end

WestfaliaSurge

Teat Cleanliness Scorecard

1
Clean:
No manure, dirt, or dip

2
Dip Present:
No manure or dirt

3
Small amount of
dirt and manure present

4
Larger amount of
dirt and manure present



1					2					3					4				
6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10
11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15
16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20
21	22	23	24	25	21	22	23	24	25	21	22	23	24	25	21	22	23	24	25

Number of teats scoring 1 _____
 Number of teats scoring 2 _____
 Number of teats scoring 3 _____
 Number of teats scoring 4 _____
 Total scores _____

Percent of teats
scoring 3 & 4

Farm Name: _____

 Date: _____

• Teats scoring 3 & 4 have an increased risk of mastitis as compared to scores of 1 & 2.
 • Milkers tend to get scores of 1 & 2 on smoother teat ends and trend toward 3 & 4's as hyperkeratosis is more prevalent. For this reason, it is very important for milkers to make a physical pass across teat ends, making sure to pinch the end of the teat with the towel.

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Score 1 Free of dirt or manure					Score 2 Slightly covered with dirt/manure					Score 3 Moderately covered with dirt/manure					Score 4 Mostly covered with dirt/manure				
																			

1					2					3					4				
6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10
11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15
16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20
21	22	23	24	25	21	22	23	24	25	21	22	23	24	25	21	22	23	24	25

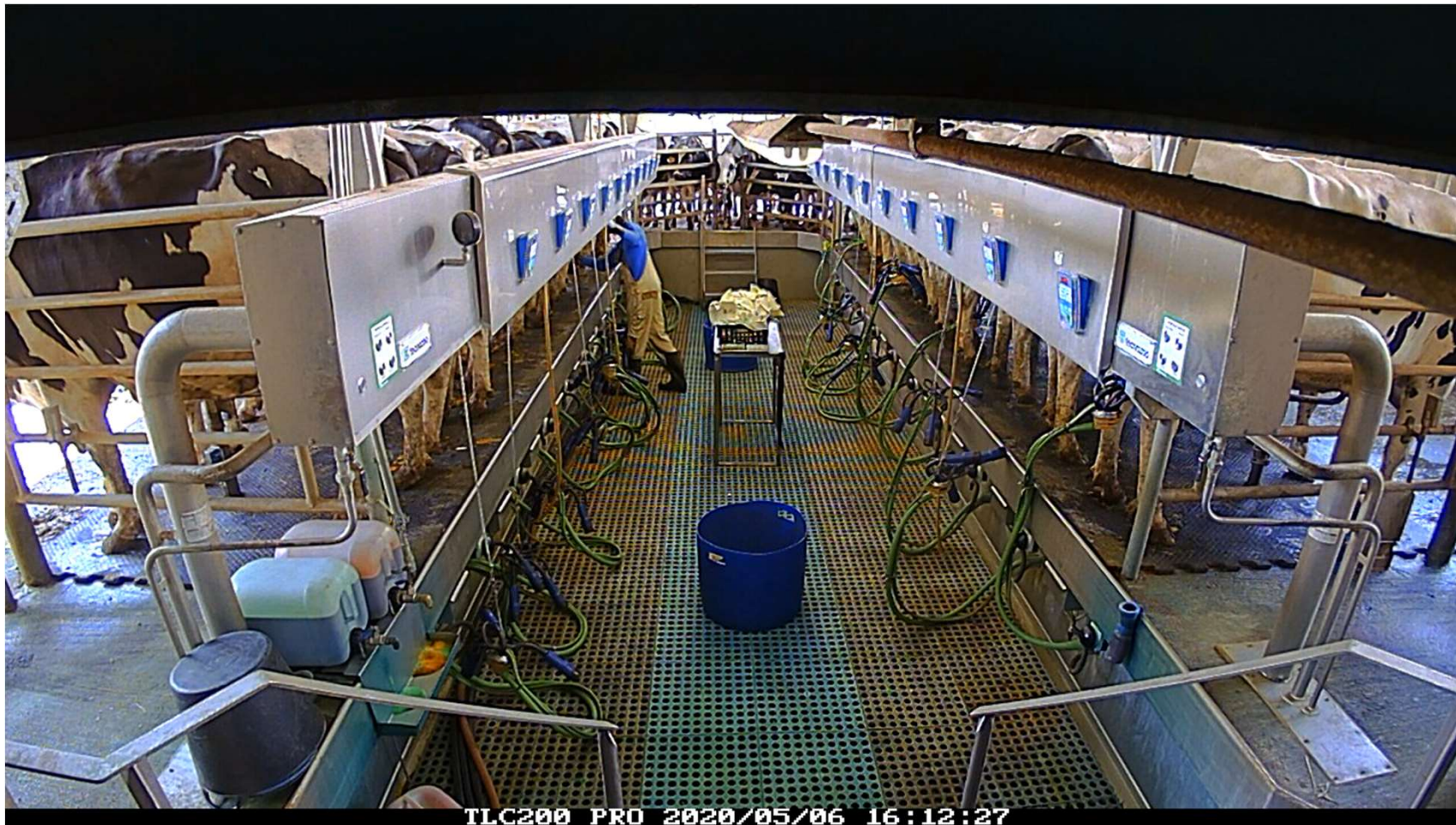
Milking Routine - Evaluation



Milking Routine - Evaluation



Milking Routine - Evaluation



MQ Basis

Milking Machine



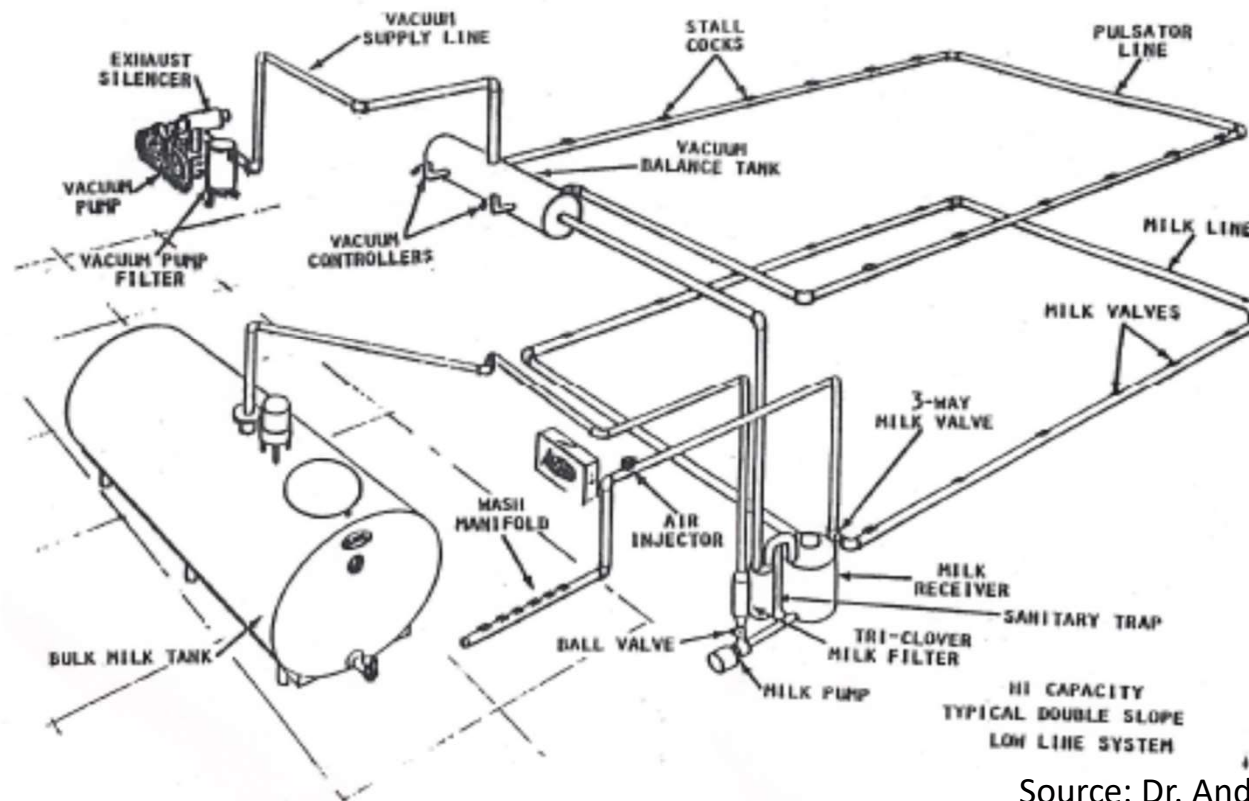
Milking Machine

Why it is so important?

- ✓ Last step in milk production process
- ✓ First point where we have the food
- ✓ It has an important impact on Milk Quality and Udder Health

Milking Machine

The Milking System



Source: Dr. Andy Johnson

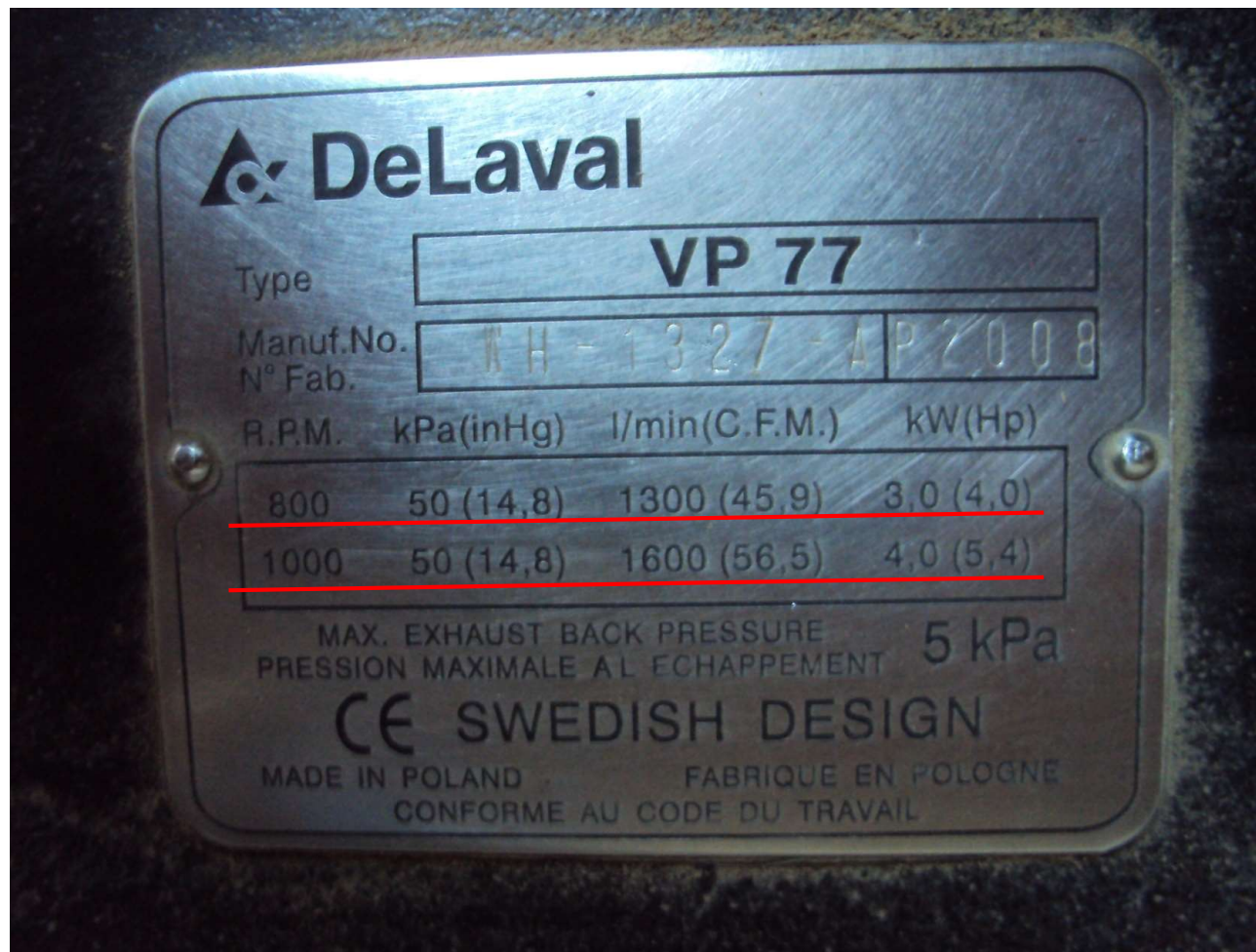
Key Elements – Vacuum pumps



35 scfm + 3 scfm/unit
990 Lmin + 85 Lmin/unit

(Mein et al.)

Key Elements – Vacuum pumps



Key Elements – Regulators or VSP



Key Elements – Regulators or VSP

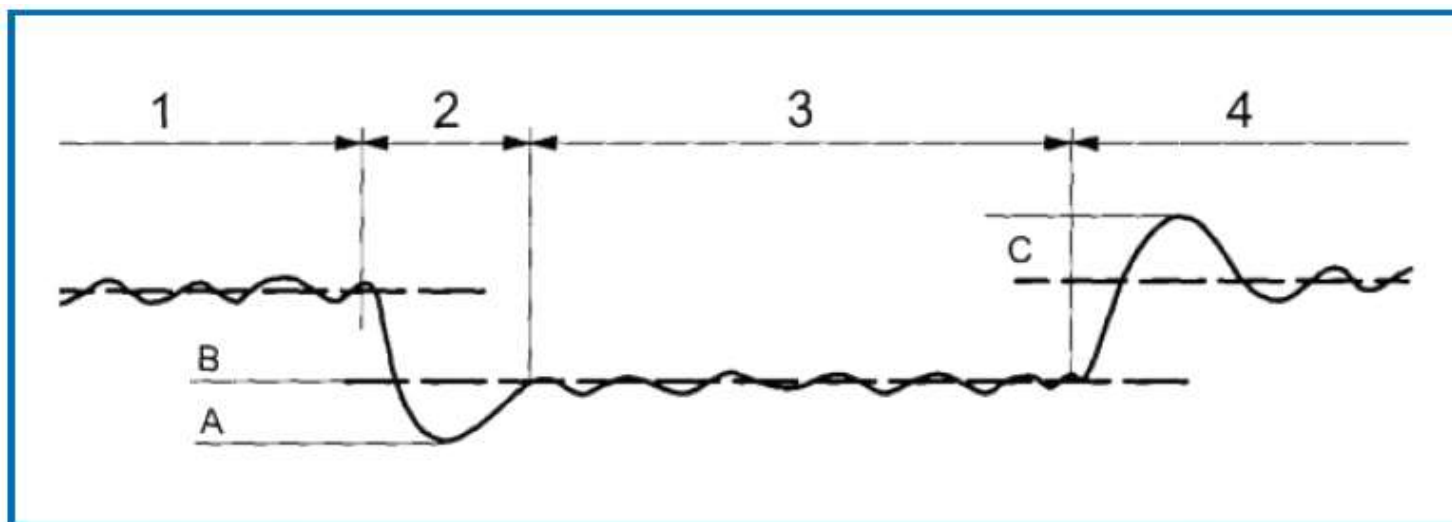
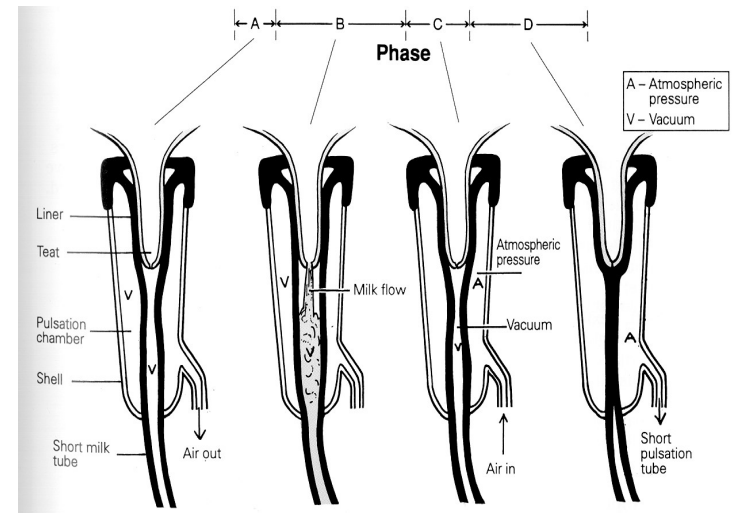


Figure 2: Regulation undershoot, vacuum drop and regulation overshoot for rapid changes in air admission

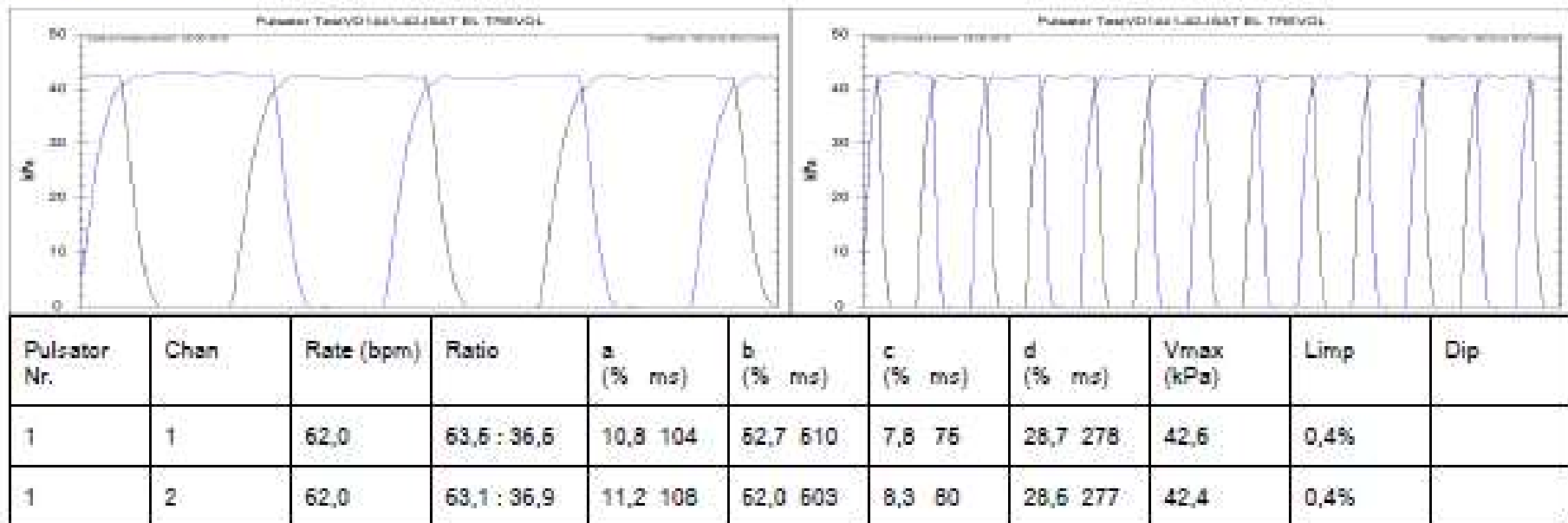
Key	A undershoot	1 Phase 1: no teatcup open
	B vacuum drop	2 Phase 2: teatcup(s) are open
	C overshoot	3 Phase 3: teatcup(s) open
		4 Phase 4: teatcup(s) are closed

Key Elements – pulsators



Key Elements – pulsators

Test Date: 01-01-2000



Key Elements – liners



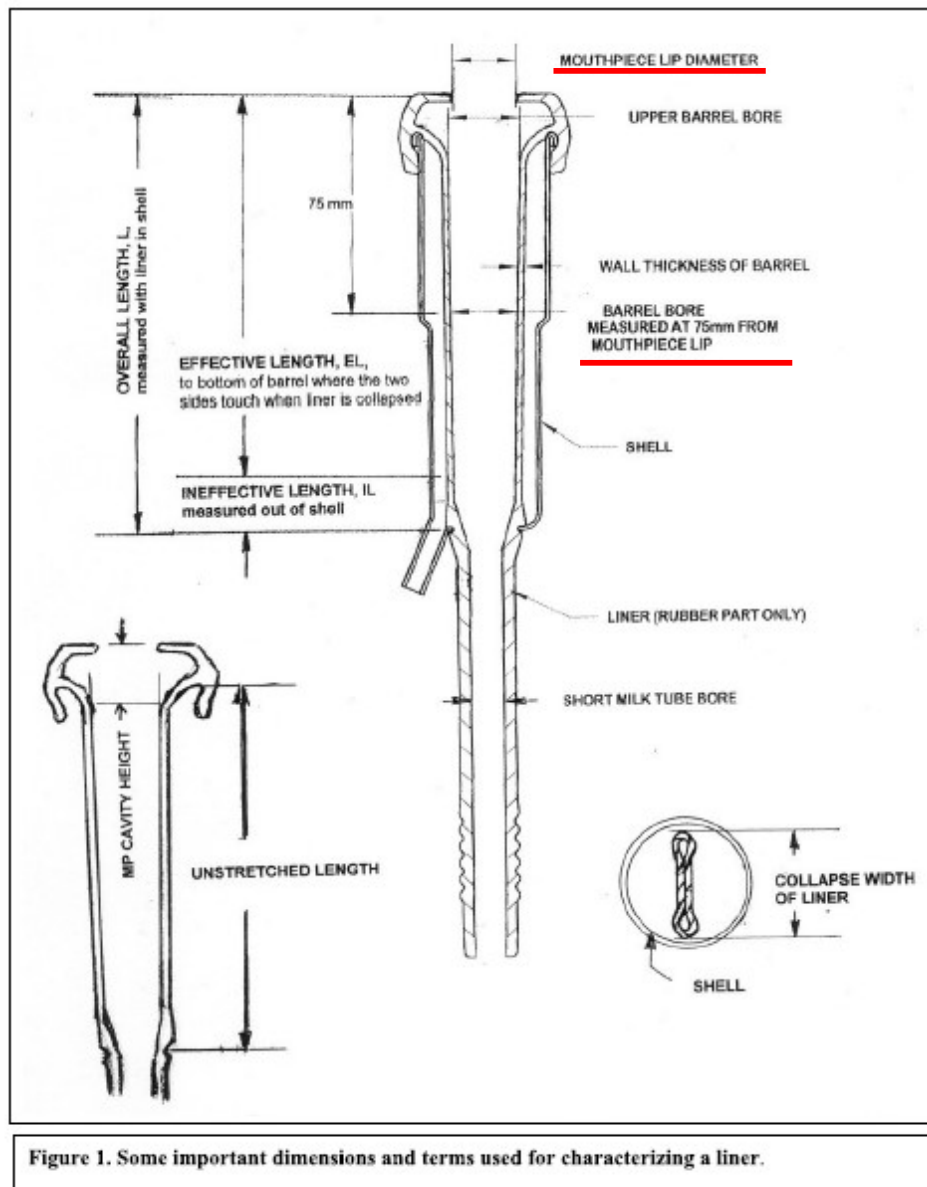
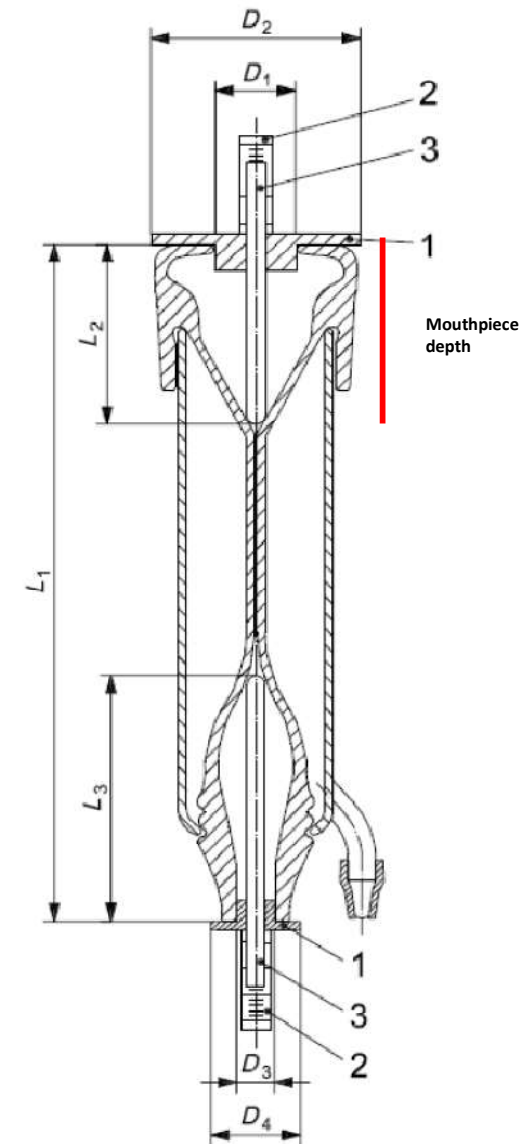
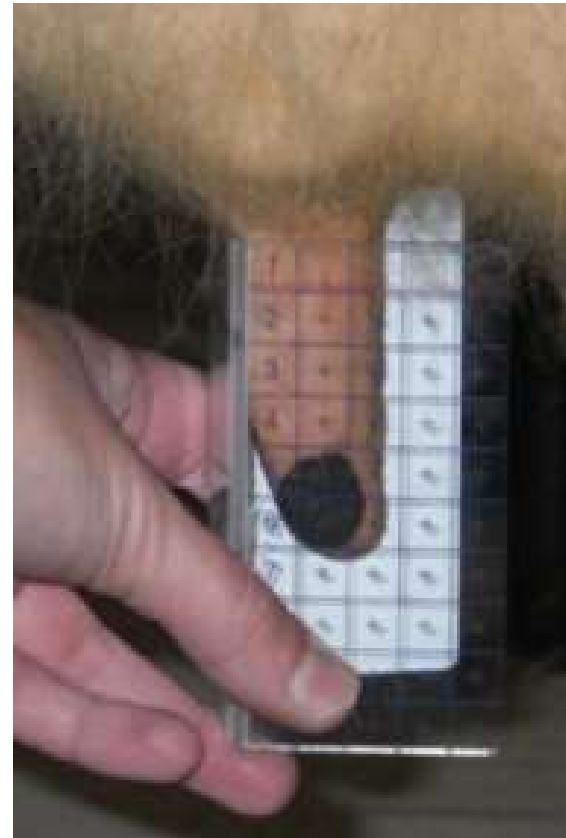
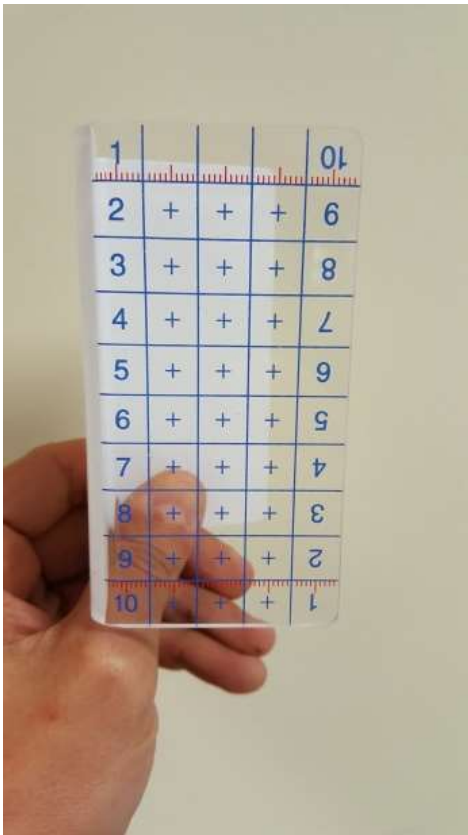


Figure 1. Some important dimensions and terms used for characterizing a liner.



Milking Machine – Liners



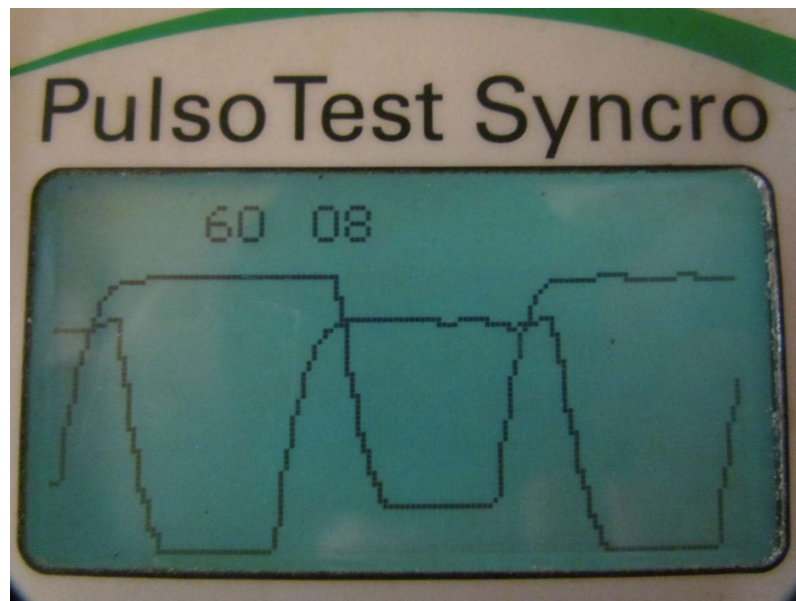
Milking Machine – Influence on MQ

We want to have a **FAST, COMPLETE** and **GENTLE** milking



Milking Machine – What do we need?

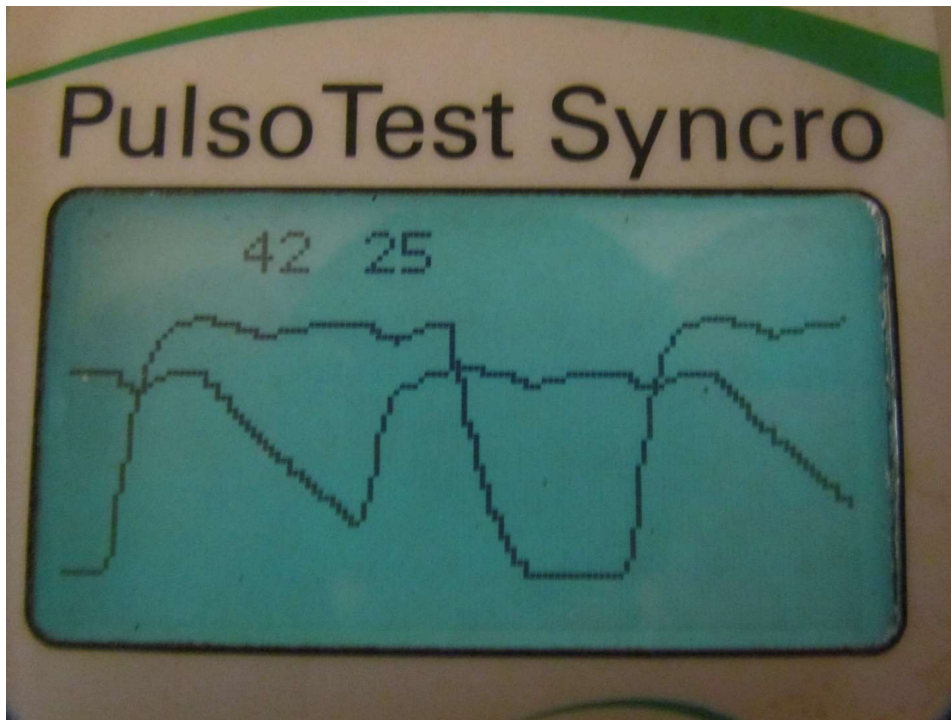
1. Good pulsation Performance



PulsoTest Syncro

	60	CA1	CA2
COJED			0,1
FREC PULSA	62,1	62,1	
E [%]	64,1	64,0	
F [%]	35,9	35,9	
MAX kPa	42,3	42,7	
MIN kPa	0,0	0,0	

Milking Machine – What do we need?



Milking Machine – What do we need?



Milking Machine – What do we need?

1. Good pulsation Performance
2. Appropriate Vacuum Level

Milking Machine – What do we need?

Low line: 42-44 Kpa

Mid line: 46-48 Kpa

High line: 50-52 Kpa

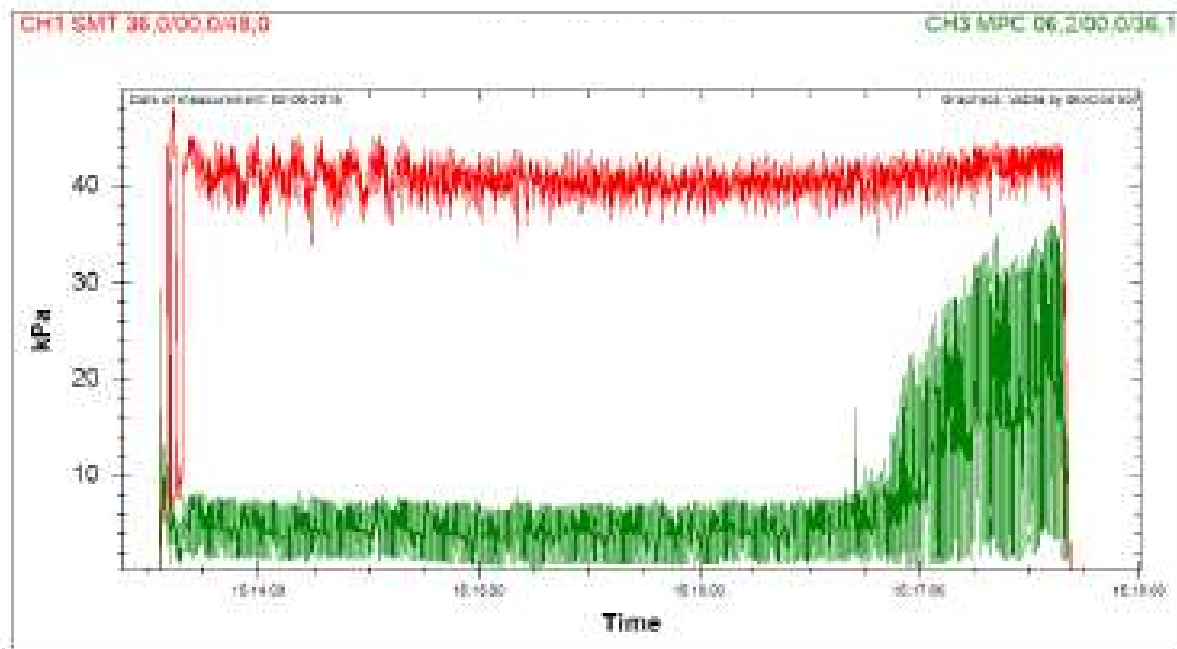
Key point is vacuum at teat end!!

38-40 Kpa

Milking Machine – What do we need?



Milking Machine – What do we need?

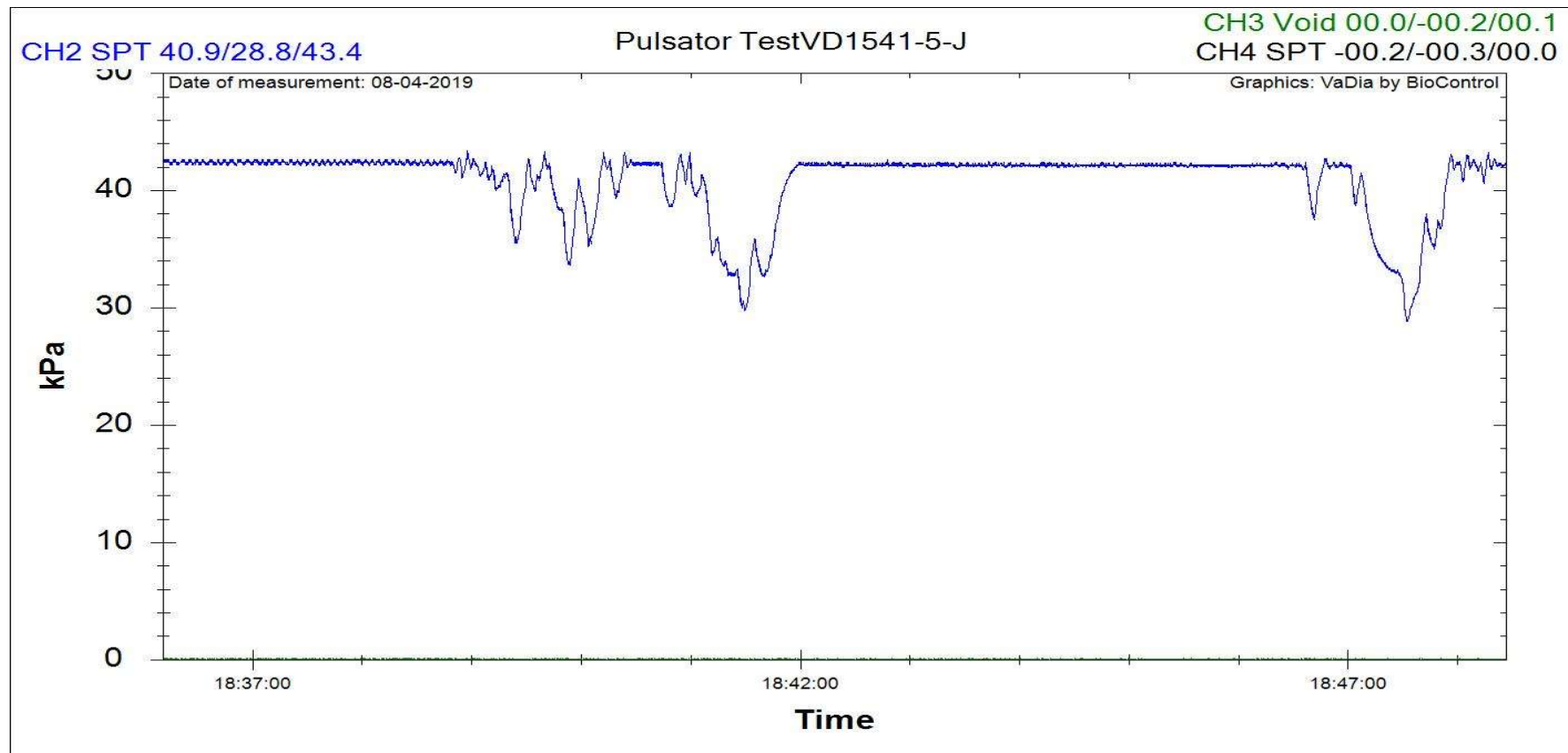


Animal	7
Attachment	03:13:34
Machine on	4:06
Overmilking	0:43
Average short milk tube vacuum	
Total	40,6
PF period	40,7
Overmilking	42,1
Cycl. Vac. Fl.	
Maximum	43,0
Minimum	38,3
Average	40,7
MPCVac. PFP	12,7
Int. Vac. Fl.	3
Av. Milk Flow	0,0
Milk yield	0,0

Milking Machine – What do we need?

1. Good pulsation Performance
2. Appropriate Vacuum Level
3. Vacuum Stability

Milking Machine – What do we need?



Milking Machine – What do we need?

1. Good pulsation Performance
2. Appropriate Vacuum Level
3. Vacuum Stability
4. Proper ACR settings

Milking Machine – What do we need?

Recommendations:

- 2x: 400-600 g/min
- 3x: 600-1000 g/min



Dr Andy Johnson

Manual Residual Milk: 200-300 ml

Milking Machine – What do we need?



No ring (N)

SCORE 1



**Smooth or
Slightly rough
ring (S)**

SCORE 2

Milking Machine – What do we need?



**Rough
ring (R)**

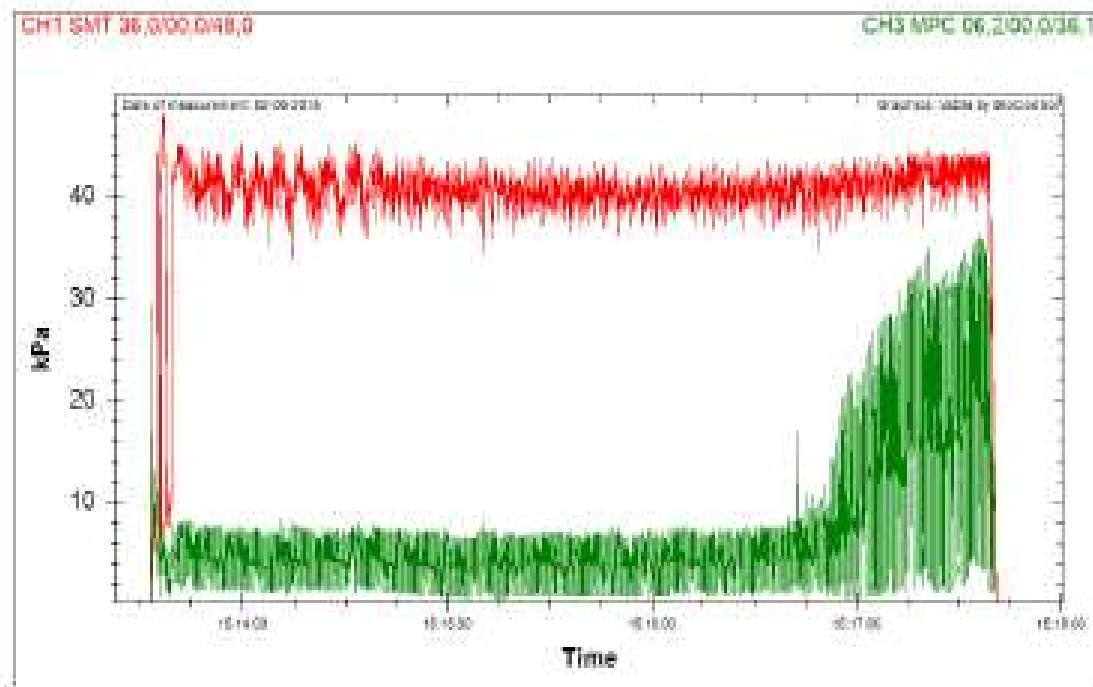
SCORE 3



**Very Rough
ring (VR)**

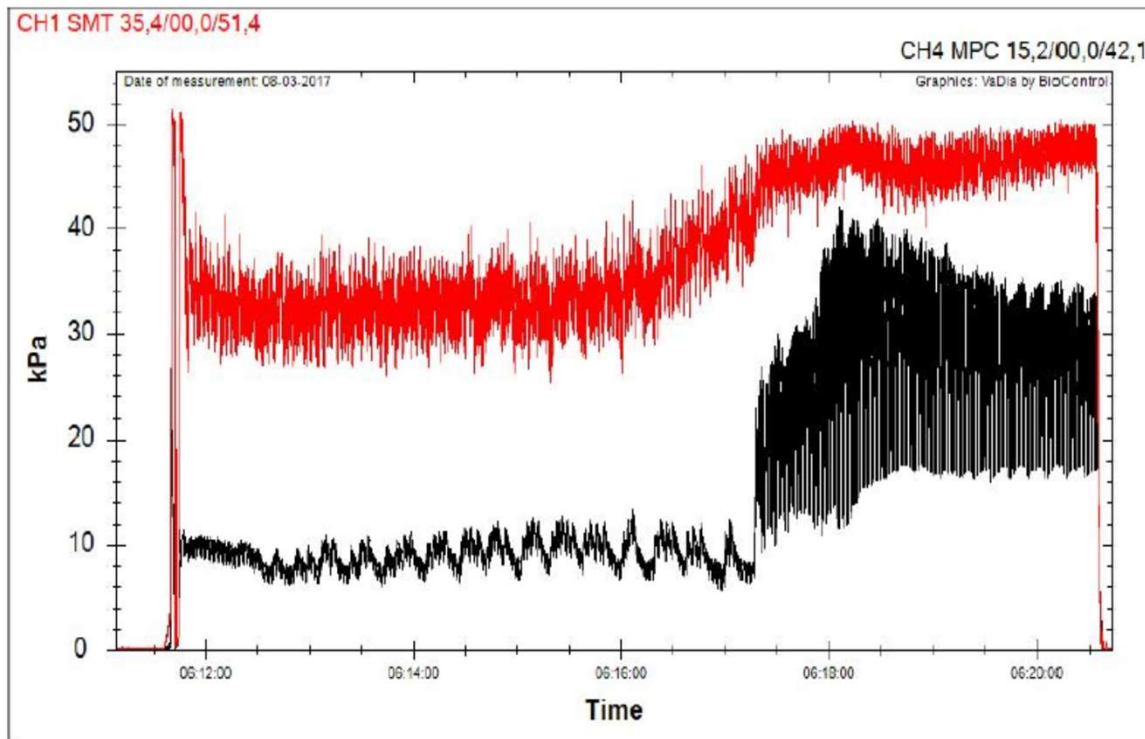
SCORE 4

Milking Machine – What do we need?



Animal	7
Attachment	03:13:34
Machine on	4:06
Overmilking	<u>0:43</u>
Average short milk tube vacuum	
Total	40,6
PF period	40,7
Overmilking	42,1
Cycl. Vac. Fl.	
Maximum	43,0
Minimum	38,3
Average	40,7
MPCVac. PFP	12,7
Irr. Vac. Fl.	3
Av. Milk Flow	0,0
Milk yield	0,0

Milking Machine – What do we need?



Animal	1
Attachment	00:00
MachineOn	08:55
Overmilking	<u>02:37</u>
Average short milk tube vacuum	
Total	38,0
PF period	34,5
Overmilking	46,3
Cycl. Vac. Fl.	
Minimum	28,4
Average	31,5
Maximum	35,9
MPCVac. PFP	10,7
Irr. Vac. Fl.	1
Av. Milk Flow	0,0
Milk Yield	0,0

Milking Machine – What do we need?

[Parlour General Data](#) |
 [Parlour Pulsation And Milk Meter](#) |
 [Parlour Auto Take Off](#) |
 [In Parlour Feeding](#) |
 [Parlour MU200D And Backflush](#)

Parlour General Data

Parlour No	Type	ID Mode	Length Row 1	Side Row 1	Length Row 2	Side Row 2	Length Row 3	Side Row 3	Length Row 4	Side Row 4
1	Rotary	2	24	Left	0	Right	0	Left	0	Right

Parlour Pulsation And Milk Meter

Pulsation			Milk Meter			
Parlour No	High Puls Rate	High Puls Ratio	Parlour No	Milk Meter	Input Milk Weight	Photo Cell
1	60	65	1	4	-	-

Parlour Auto Take Off

Parlour No	Auto take Off	Max. Pre Milking	Low Flow	Take Off Limit	Post Milking	Take Off Delay	Milk Sweep	Sweep Delay	Sweep Dur.	Vacuum On Delay	No Puls. Takeoff	2nd Premilk Time
1	1	120	0.2	0.3	20	3.5	Yes	3.0	1.0	0.0	-	Inactive

Milking Machine – What do we need?

[Parlour General Data](#) |
 [Parlour Pulsation And Milk Meter](#) |
 [Parlour Auto Take Off](#) |
 [In Parlour Feeding](#) |
 [Parlour MU200D And Backflush](#)

Parlour General Data

Parlour No	Type	ID Mode	Length Row 1	Side Row 1	Length Row 2	Side Row 2	Length Row 3	Side Row 3	Length Row 4	Side Row 4
1	Herringbone	2	10	Left	10	Right	0	Left	0	Right

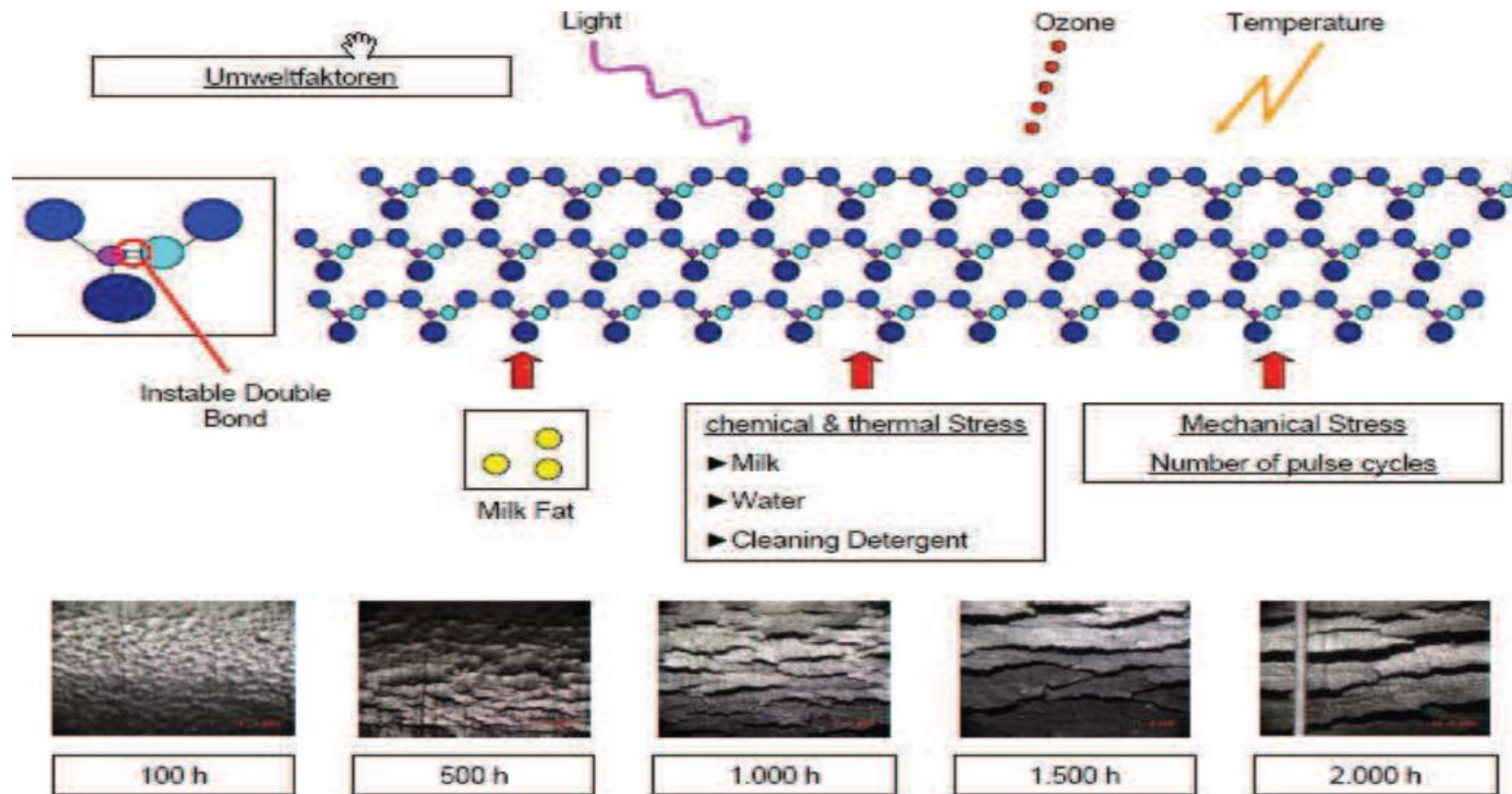
Parlour Pulsation And Milk Meter

Pulsation			Milk Meter			
Parlour No	High Puls Rate	High Puls Ratio	Parlour No	Milk Meter	Input Milk Weight	Photo Cell
1	60	65	1	1	Yes	-

Parlour Auto Take Off

Parlour No	Auto take Off	Max. Pre Milking	Low Flow	Take Off Limit	Post Milking	Take Off Delay	Milk Sweep	Sweep Delay	Sweep Dur.	Vacuum On Delay	No Puls. Takeoff	2nd Premilk Time
1	1	120	0.5	0.8	5	3.0	-	3.0	3.0	0.0	Yes	Inactive

Milking Machine – Liners maintenance



Milking Machine – Liners maintenance

2500 or 5000

$((\text{num cows} \times \text{num milkings}) / \text{num milking stalls})$

2500 milkings (Rubber liners)

5000 milkings (Silicone liners)

Milking Machine - Maintenance

- It is absolutely necessary a maintenance plan
- Liners, milk tubes, pulsators, rubber membranes, regulator, etc

COMPONENTE	1	2	3	4	5	6	7	8	9	10	11	12
control/cambio correas												
filtro recirculador aceite												
membrana regulador												
filtro sensor VRS												
válvula antiretorno unidad final												
junta colector												
pezoneras												
entradas aire en el colector												
juego de membranas pulsadores												
gomas y membranas medidores												

MQ Basis

Environmental and Cow Comfort Evaluation



Goals

- Fullfill Cow Comfort requirements
- Provide an hygienic area to rest

Cow Comfort Goals

Table 1. Typical daily time budget for a lactating dairy cow.

Activity	Time devoted to activity per day
Eating	3 to 5 h (9 to 14 meals/d)
Lying/resting	12 to 14 h
Social interactions	2 to 3 h
Ruminating	7 to 10 h
Drinking	30 min
Outside pen (milking, travel time)	2.5 to 3.5 h

Cow Comfort Goals

Table 2. Daily behavioral time budget for top 10% of cows by milk production and average milk production cows (h/d).¹

Activity	Top 10%	Average
Eating at manger	5.5	5.5
Resting	14.1 ^a	11.8 ^b
Standing in alleys	1.1 ^b	2.2 ^a
Perching in stalls	0.5 ^b	1.4 ^a
Drinking	0.3	0.4

^{ab}Means within a row differ ($P < 0.05$).

¹Adapted from Matzke (2003).

Source: Rick Grant, W.H. Miner Agricultural Research Institute, Dairy-cattle

Cow Comfort Goals

- Increase lying time
 - Increase ruminating time
 - Less stress
 - Better health records (reproduction, lameness and mastitis)
 - Increase cows' longevity
- 
- Higher milk yield
 - Higher milk solids

Stress reaction

(special acknowledgment to Dr. Antoni Dalmau, IRTA)

- Physiological reaction to external stress factors
- Chronic stress reaction is a problem
- First reaction:
 - Catecholamines (adrenaline and noradrenaline)
 - Increase cardiac frequency and respiratory frequency
 - Increase muscular tone
 - State of alert
 - Very expensive in terms of energy cost

Stress reaction

(special acknowledgment to Dr. Antoni Dalmau, IRTA)

- Second reaction:
 - Cortisol
 - Provide energy to the stress reaction system
 - Glicolysis
 - Lipolysis
 - BCS loss
 - Disconnect other functions :
 - not crucial for our live: reproduction
 - expensive functions: immune system

Stress reaction

(special acknowledgment to Dr. Antoni Dalmau, IRTA)

- Chronic stress consequences:
 - Reduced reproduction performance
 - Depressed immune system
 - Health problems (mastitis and lameness)

Cow Comfort Areas

- Heat Stress
- Density
- Resting area (freestalls and open yards)
- Ventilation
- Other facilities design
- Floors
- Milking time comfort

→ MAINTENANCE

Cow Comfort Areas

“Let the cows tell you
what’s going on”

Dr. Chuck Guard, Cornell University

Cow Comfort – Heat Stress



Cow Comfort – Heat Stress



Bedding management goals

Cow

clean

dry

comfortable

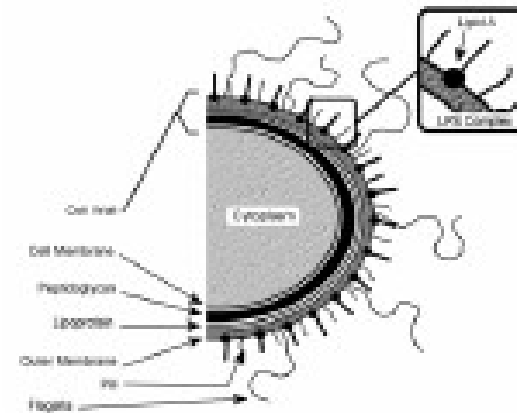


Bacteria

cold

thirsty

hungry



Bedding management goals



Bedding management goals

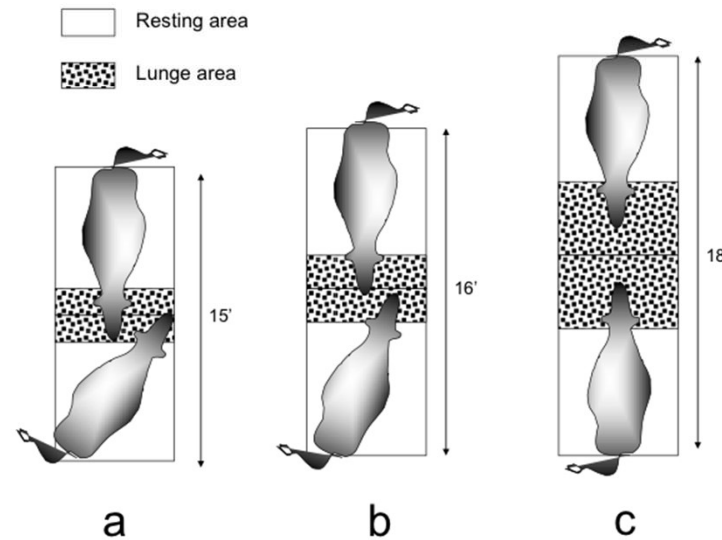
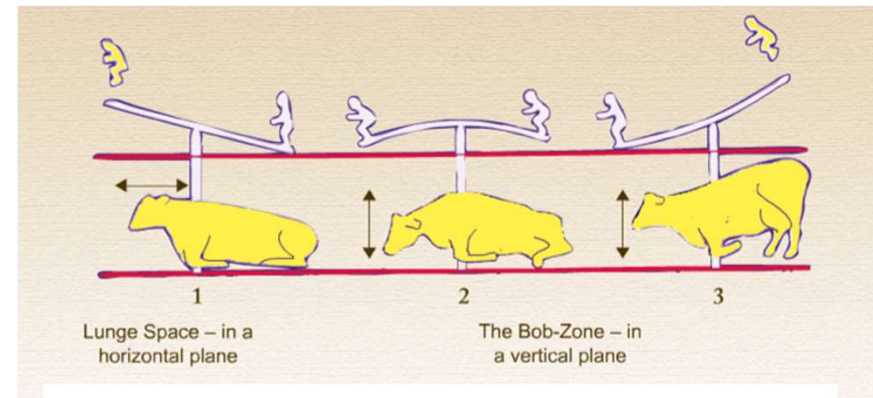
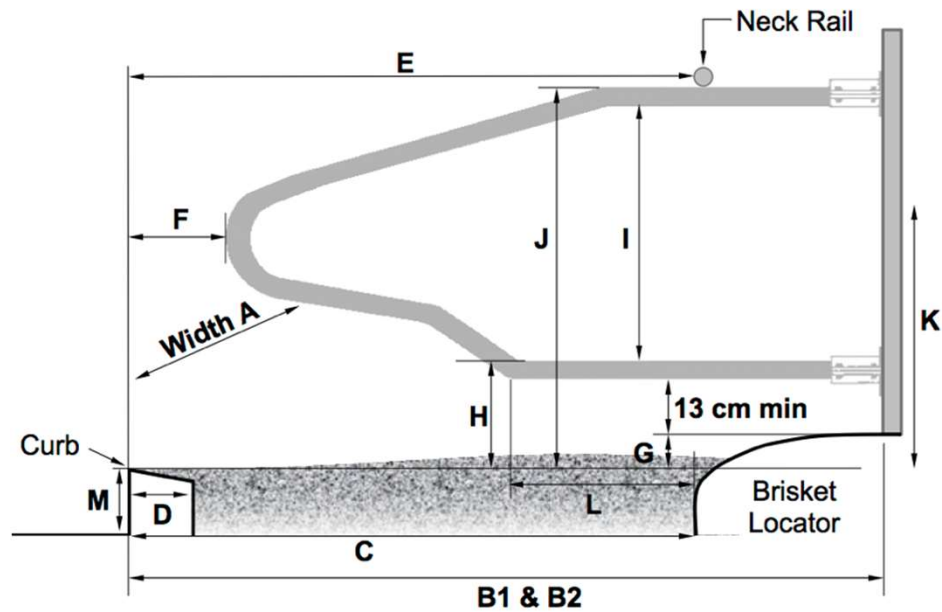


Bedding Systems

- Open yards
(or bedded pack pen)
- Freestall



Resting area - Freestalls



Source: <https://thedairylandinitiative.vetmed.wisc.edu/>

Freestall design

13:43 Martes 21 de septiembre 82%

SCHOOL OF VETERINARY MEDICINE
University of Wisconsin - Madison

Freestall Assessor

U.S. Metric

Dairy Name: Mas Bes Barn: 1
Assessor Name: Qlet slp Date: 16/9/21

Value Default

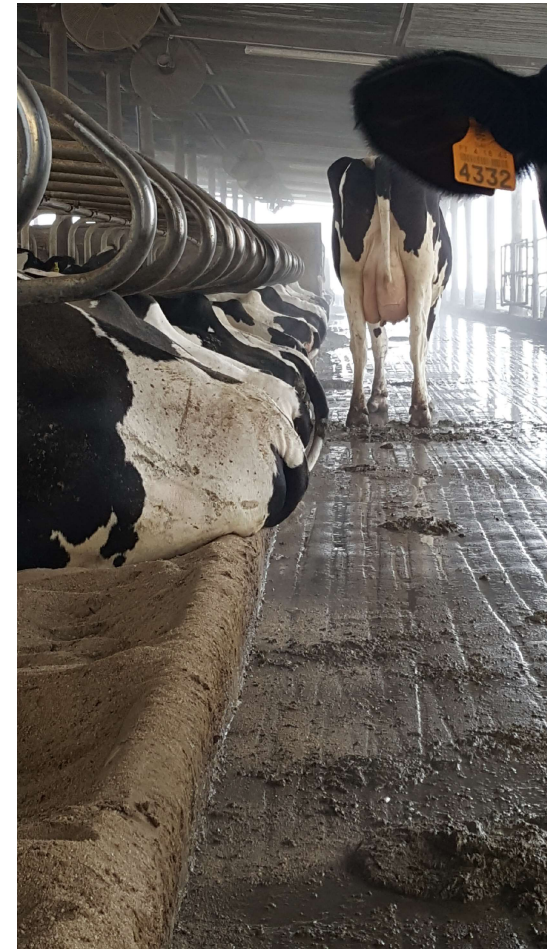
(A) Stall width		122
(B1) Stall length (single)		274
(B2) Stall length (double)		488
(C) Curb to brisket		173
(D) Rear curb width		15-20
(E) Neck rail to curb		158
(F) Rear of divider to curb		23
(G) Brisket locator height		10
(H) Lower loop height		31
(I) Interior loop diameter		84
(J) Neck rail height		122
(K) Obstruction height		13-89
(L) Brisket to loop angle		51-56
(M) Curb height		20

Mat/Mattress: Deep loose bed

Divider Type: Front/Side lunge loop
Freestall Alignment: Single/Double
Cow Size (kg): 640

Report Clear All

Freestall design



Freestalls



Freestalls



Freestalls



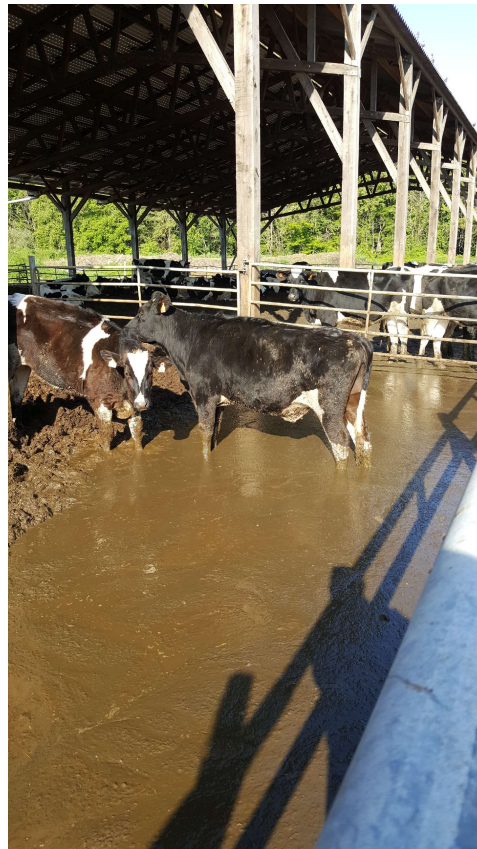
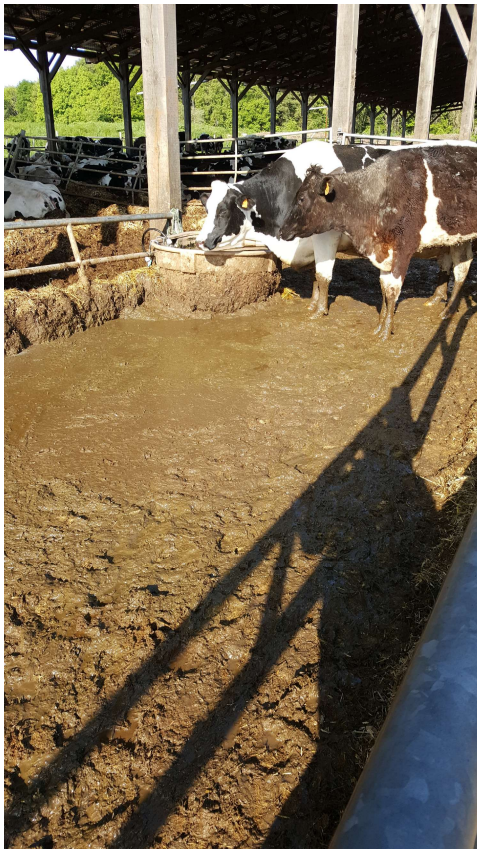
Freestalls



Freestalls



Hygiene



Hygiene



Hygiene



Hygiene



Bedding material - sand

- Inorganic material
- Some problems:
 - Availability
 - Cost
 - Manure management
 - Field impact
- Take care with recycled sand



Bedding material – compost (DMS)

- Sources:
 - Manure solids separator
 - Dry cows or heifers bedding



Bedding material – compost (DMS)

- Dry Manure Solids production:
 - Direct from solids separator (green bedding)
 - Natural composted manure
 - Mechanically dried manure
 - Air injectors
 - Drying trommels



Bedding material – compost (DMS)

- Dry Manure Solids production:
 - Direct from solids separator (green bedding)
 - Natural composted manure
 - Mechanically dried manure
 - Air injectors
 - Drying trommels



Bedding material – compost (DMS)

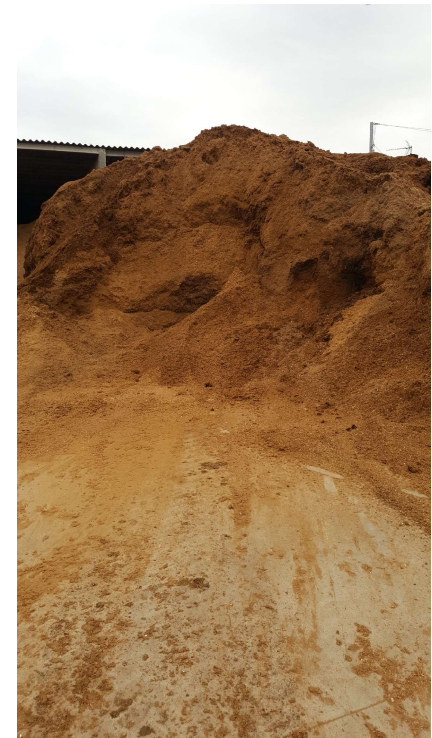


Bedding material – compost (DMS)



Bedding material -sawdust

- Source of material
- Storage control
- Main problems with *Serratia*, *E.coli* or *Klebsiella*



Bedding material - straw

- Particle size
- Daily maintenance
- Calcium daily (0,5-0,8 kg/day)
- Mixture straw + calcium + water
- Main problems with *Strep uberis*



Bedding material - mattresses

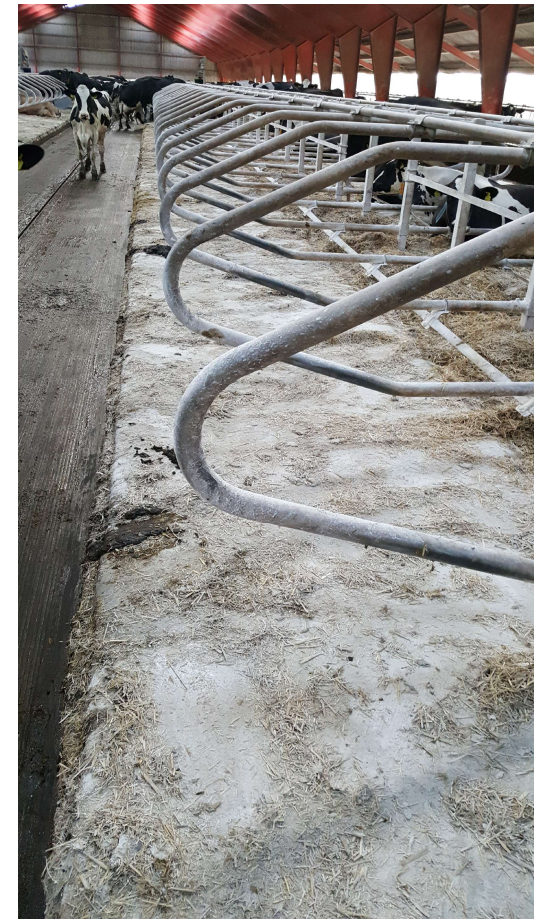


Bedding material - mattresses



Bedding material - mattresses

- Brush them at each milking time
- Add drying material
- Different options:
 - Hard rubber
 - Chopped rubber
 - Latex
 - Water mattresses



Info Source



DairylandInitiative

UNIVERSITY OF WISCONSIN-MADISON

- <https://thedairylandinitiative.vetmed.wisc.edu/>



School of Veterinary Medicine

DairylandInitiative

UNIVERSITY OF WISCONSIN-MADISON

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Housing Module

The Guide to Welfare-Friendly Dairy Cattle Housing.



Lifestep Lameness Module

A Lesion-Oriented, Life Cycle Approach to Lameness Prevention



Calf Health Module

Healthy Calves, Healthier Cows - #WeanClean

Adult Cow Housing



Housing Module

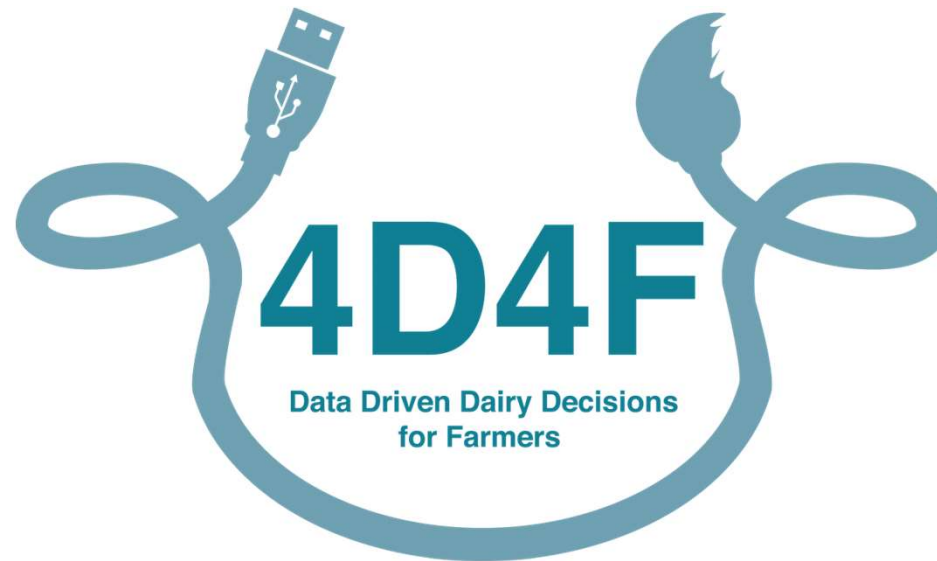
The Wisconsin Blueprint for The Dairyland Initiative

- Adult Cow Housing
- Replacement Housing
- Virtual Tours
- Tools

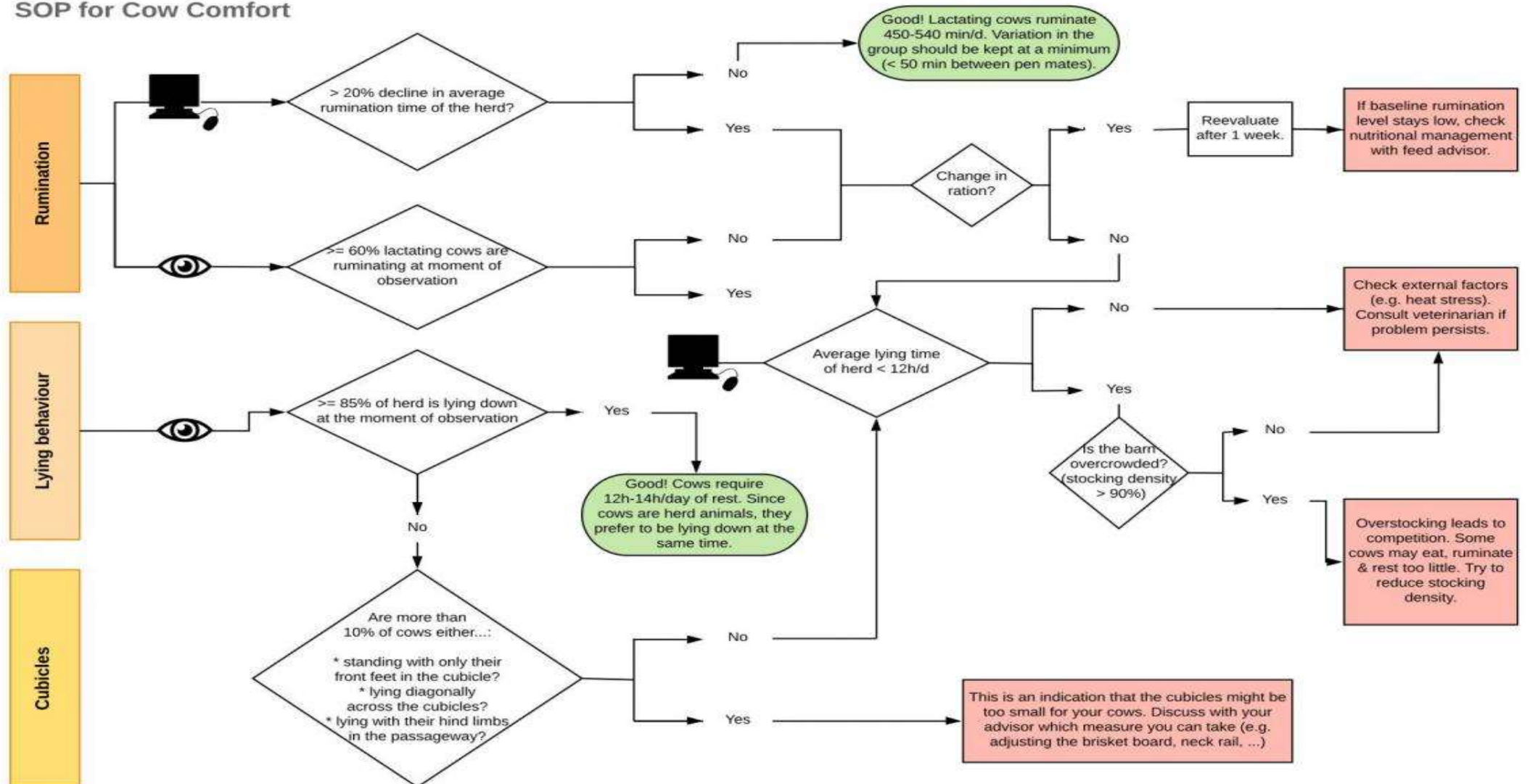
BARN PLANNING CHECKLIST	MANURE MANAGEMENT	TRANSITION COW HOUSING	GROUP SIZE
BARN LAYOUT	STALL LAYOUT	ALLEYWAY DIMENSIONS	FLOORING
MILKING PARLOR HOLDING AREA	FEEDBUNK DESIGN	WATER SPACE	FREESTALL DIMENSIONS

Environment Evaluation

https://4d4f.eu/sites/default/files/SOP%20cow%20comfort_Feb2019%20v2.pdf



SOP for Cow Comfort



Disclaimer: While all reasonable efforts have been taken by the author to ensure the validity of this SOP, the author, 4D4F and the funding agency accept no liability for any loss or damage stemming from reliance upon this document. Use this document at your own risk, and please consult your veterinarian or advisor to ensure that the actions suit your farm. 28/02/2019.



Time Lapse camera



Environment Evaluation



TLC200 PRO 2020/09/23 12:31:00

Environment Evaluation



Summary

- Make yourself the right questions and you will find the right answers
- No great secrets on Milk Quality. Use your common sense.
- Everytime in trouble, go to the basis
- Take care of the four legs of the chair. They are equally important!
- We work more with people than with cows
- Not only control the pathogen, also reinforce the immune system of the cow

Bedankt!!



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