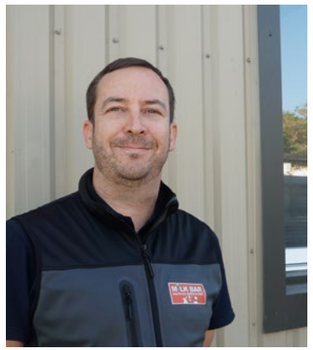
GUIDE TO REARING HEALTHY CALVES

(Lambs and kids)

AGRICLÉ

We are pleased to present our Guide to Rearing Healthy Calves (the method also applies to lambs and kids). You will find all the information you need to optimize your yield and have productive, healthy calves. What is the key to success? Replicating suckling as accurately as possible and following a working protocol.



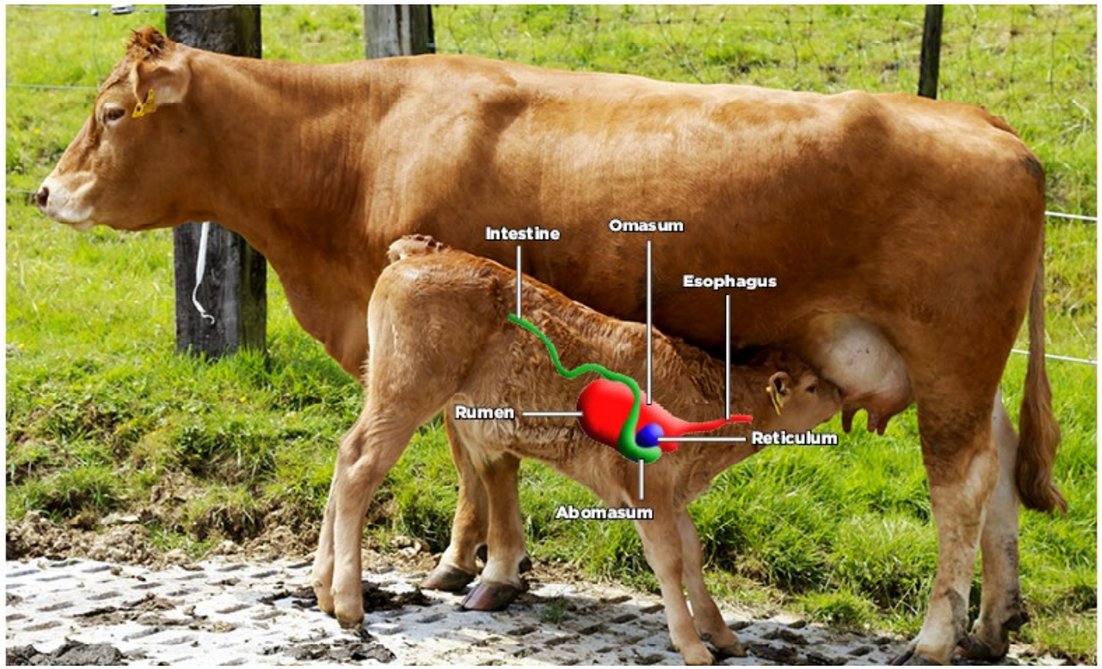
This booklet was produced in collaboration with Samuel Malard, Milk Bar Specialist for rearing and suckling of calves in Europe and Canada. For more than 12 years, Mr. Malard has been working to establish an effective protocol to ensure that herds grow healthy and provide optimum yield.

Bernard Dion is Technical Director at Agriclé and an Animal Welfare Specialist. With years of experience in pig farming, he specializes in advising farmers to provide them with the tools they need to achieve their goals.

HOW DOES THE DIGESTIVE SYSTEM OF CALVES WORK

When the calf is feeding under its mother, its neck is stretched up, it ingests slowly, and it produces a lot of saliva.
Here are the three reasons why:

- This position closes the esophageal groove so that the milk bypasses the rumen and goes into the abomasum.
- Once in the abomasum, the rennin (which is a rennet) and the enzymes promote good curd.
- The curd is then broken down by other enzymes before passing into the intestine to be absorbed.



Abundant Saliva Plays a Very Important Role During Feeding

At the very beginning, the calf can take up to four minutes per litre to feed. This allows it to produce a lot of saliva which provides the following properties:

- It balances the pH in the abomasum and helps curdle the milk.
- It contains lipase, an enzyme needed to digest fats, a vital source of energy for calves.
- It contains natural antibiotic properties.

What Happens When the Calf Drinks Too Quickly

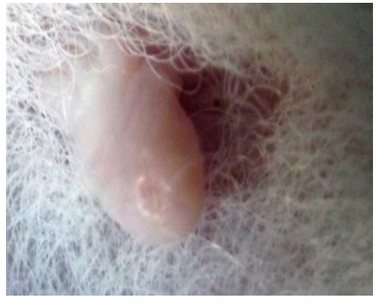
- If a calf drinks milk too quickly, it will not produce enough saliva and it will try to feed on its congeners to fulfill its needs (group feeding or cross-suckling problems). This could result in damage to juvenile udders and, in the long run, lead to the appearance of mastitis on the heifer.
- Fast feeding can create an overflow through the esophageal groove and lead the milk into the rumen where it will ferment, which could cause digestive disorders.
- Gulping and not having abundant saliva can also cause a lack of curd, which allows the milk to enter the intestine and cause bacterial fermentation and nutritional diarrhea (E. coli bacteria multiply rapidly on contact with raw milk, which is one of the main causes of nutritional diarrhea in young calves).

Independent tests conducted in 2014 fed six groups of calves on the same farm with the same rations and under the same conditions.

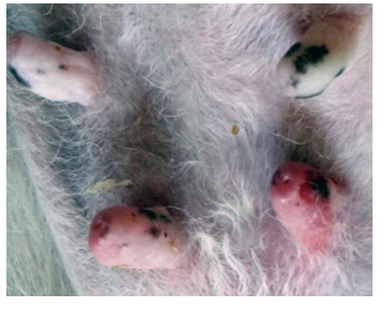
Group 1: Calves fed with a Milk Bar teat (without internal valve). Slow and controlled feed rate.

Group 2: Calves fed with an internal valve teat (or check valve). Fast feed rate.

Tests have shown that group feeding problems occur when calves are fed too quickly.

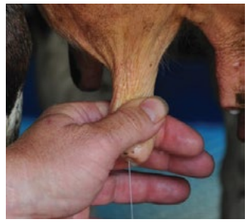


Group 1
The udders show no damage.
The teat and its keratin top are in perfect condition.
The udders are protected from infections.



Group 2
The udders show damage on two teats.
The sphincter is open, and the keratin top has disappeared.
The udders are prone to infections.

If you squeeze a teat, no milk comes out.



You must squeeze and pull the teat down to force the milk past the sphincter barrier.

If you squeeze a Milk Bar teat, no milk comes out. The calf must squeeze and pull the teat as per its instinct.

If you squeeze an internal valve teat, the milk squirts heavily. The calf pumps the teat and releases a high volume of milk. This is an unnatural way of suckling because the calf is force fed.

Milk Ejection and Teat Design

The teat milk ejection reflex occurs when stimulation releases oxytocin into the bloodstream. Oxytocin causes contraction of myoepithelial cells and ejects milk from alveolar cells into the lactiferous ducts and the reservoirs above the teats.
The ejection reflex does not release the sphincter muscle to allow the milk to exit the teat duct. It must be physically open to let the milk flow.

When a calf feeds under the cow, it applies both positive and negative pressure (compression and suction). Compression stimulates the teat, which releases oxytocin. Only suction allows the milk to get past the sphincter barrier and feed the calf.

When a calf feeds with a Milk Bar teat, it applies both positive and negative pressure (compression and suction) to open the barrier and obtain milk.

When a calf feeds with an internal valve teat, only positive pressure is applied.
The calf drinks very quickly (often less than a minute per litre) and produces little saliva.

The Design of the Teat Influences the Suckling Action

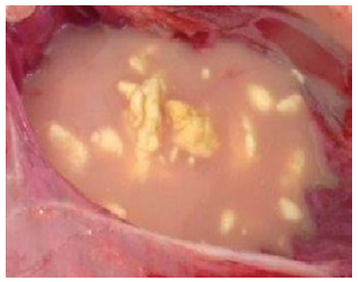
The Milk Bar teat flow*, controlled by the specific combination of its shape (design) and a specially formulated rubber, creates a natural suckling action and prevents the calf from gulping the milk. The teat replicates that of the cow as closely as possible.

*International patent applications and designs apply PCT/NZ2016/050190

Curdling and Digestibility

Calves fed with a Milk Bar teat have better growth and digestibility.
Analysis results have shown significant differences in milk curdling and lactose absorption in 14-day-old calves*, two hours after suckling.
*Scientific publication of the Journal of Applied Animal Nutrition (JAAN), Cambridge University, August 2015

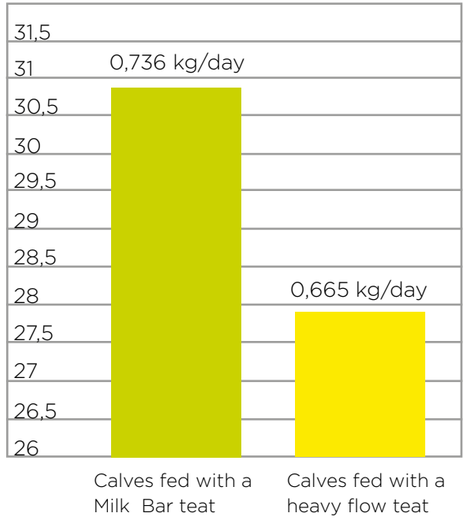
Group 1 (Milk Bar™ teat)
- Healthy abomasum with a homogenous curd
- Weight gain of 0.736 kg per day
- 3 mg/g of lactose remains in the abomasum
- Less lactose (sugar) in the intestine



Group 2 (heavy flow teat)
- Milk lumps hardened in the abomasum and floating in an aqueous liquid
- Weight gain of 0,665 kg per day
- 12 mg/g of lactose remains in the abomasum
- There is a higher level of lactose in the intestine and feces. This allows pathogens to multiply rapidly and cause diarrhea

Research has shown that 42-day-old calves, fed with Milk Bar™ teats, weigh 2.982 kg (10.68%) more.

Significant indications of a higher lactose level in the intestines in calves fed with a heavy-flow and internal-valve teats may be the main reason for diarrhea. Lactose is a form of sugar and it fosters the growth of bacteria in the intestine.

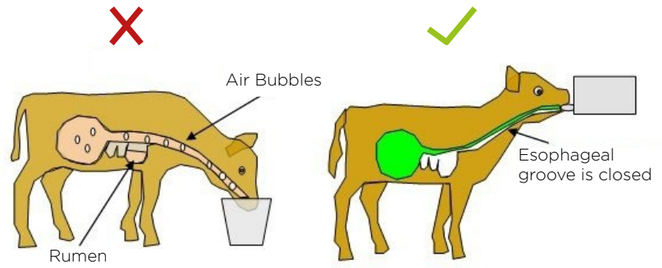


Nutritional Diarrhea

Nutritional diarrhea is usually caused by an excess of sugar (lactose) entering the intestines and feeding pathogens that multiply rapidly.
It often progresses to infectious diarrhea, but can be avoided by controlling the amount of milk ingested by the calf.

«Initial digestion of the milk occurs in the abomasum (or fourth stomach). Diarrhea is usually due to a failure of the latter caused by an overabundance of lactose in the intestines, which is the result of a rapid intake of milk out of the abomasum. Therefore, the milk cannot be broken down quickly enough. Pathogens use excess lactose as a source of nutrients to grow in numbers.»
Source: Victoria Department of Primary Industries.

With Milk Bar teats, calves produce a lot of saliva, and they feed at a natural rate and with an adequate and natural suckling action: the neck is stretched upwards, whereas downwards would be unnatural, which is the position of the calves when they feed from an internal valve teat or a bucket. In the latter case, calves receive heavy flow rates of milk, but they produce very little to no saliva, and their esophageal groove is not functioning properly because of the position.



Ideal feeder height is between 24 inches and 28 inches above the ground.

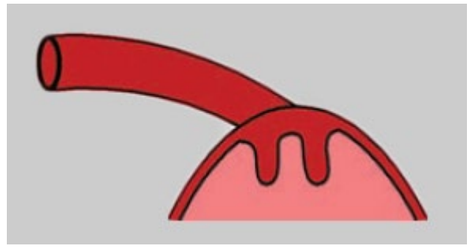
The Importance of the Esophageal Groove

The esophageal groove is a muscle found in the throat of the calf.
It helps ensure that everything that is ingested by the calf ends up in the right stomach.

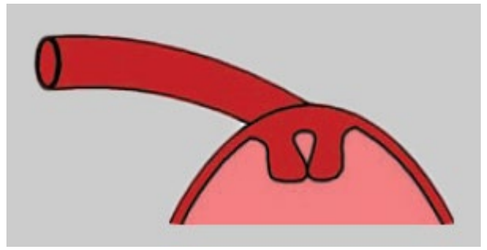
The rumen: When a calf drinks water or eats its feed ration, the groove remains bent to direct feeds into the rumen.

The abomasum: When the calf feeds under its mother, the groove closes and forms a tube to lead the milk to the abomasum for digestion. This tube is small and cannot withstand a heavy flow rate of milk that was ingested too quickly.

«It is vital for the calf's health that all the milk goes into the abomasum. If the milk enters the rumen because of fast feeding, either with an internal valve teat or a bucket, it can cause intestinal pain and the milk won't be digested by the enzymes in the rumen. Milk is a main factor in rumen acidosis and poor development.»
Source: Dr. Jim Quigley



Open esophageal groove.
When the calf drinks water or eats solid food, the muscles of the groove relax to enable the passage to the rumen.



Closed esophageal groove.
The muscles close to form a tube and direct the milk into the abomasum.

EXPERT ADVICE

Let me drink my milk slowly and at my own pace with a Milk Bar teat. I have to suckle hard to produce a lot of saliva and develop my jaw.
Also, please place my feeder at a height of 24 to 28 in (60 to 70 cm) from the ground. These simple actions will help me stay healthy and save you veterinary fees!

Rumen Development

Developing a healthy rumen early is essential to facilitate the transition from a preruminant to a ruminant animal. However, fast feeding with an internal valve teat or a bucket can make the milk overflow the esophageal groove and enter the rumen where live bacteria cause fermentation. Milk produces lactic acid that enters the bloodstream of the calf and causes depression, anorexia, and possibly death.

Concentrated grain enzymes promote rumen development, which is essential to help the calf feeding transition. A healthy rumen has a dark colour caused by the increase in tissue mass and larger blood vessels, which are essential for the good yield and profitability of the future dairy cow.

In this picture, we can see fermented milk in the rumen.

Here, a healthy four-week-old calf's rumen: it has the correct dark colour and texture, which are signs of proper state of development.

A healthy rumen promotes the calf's appetite and provides the energy intake needed for its healthy growth.

Feeding Phases

A calf needs enough energy and nutrients to grow, keep warm in the cold, or cool off in hot weather. Both grain and clean water must always be available.

- **Weeks 1 to 3:** All energy comes from colostrum or milk, not from grains. Therefore, it is important to provide enough milk to meet the energy needs of the calf. Still, grain must be provided from the first week as well, to help begin the development of the rumen.

- **Week 4:** The rumen begins to grow. Small amounts of energy come from the grain, but the majority still comes from milk.

- **Weeks 5 to 7:** By the end of the fifth week, the rumen should be sufficiently developed to reduce the intake of milk, but only if the calf eats 500 grams of grain a day. If this is the case, the volume of milk can be reduced to four litres once a day, ideally in the evening. If the calf does not eat 500 grams of grain a day, it must maintain a milk-based diet until it eats enough.

- **Weeks 8 to 12:** At this stage, the rumen is well developed for the calf to continue growing with pasture grass or a diet of hay, straw, and feed. Progressive weaning is advised.

THE *ONE CALF > ONE TEAT > ONE WEANING* METHOD

Phase 1: Training

Days 1 to 3
The calf is trained to suckle correctly with a bottle and an individual feeder with a yellow Milk Bar colostrum teat. The teat is more flexible and allows the calf to gradually develop the muscles of its jaw.

Phase 2: Development

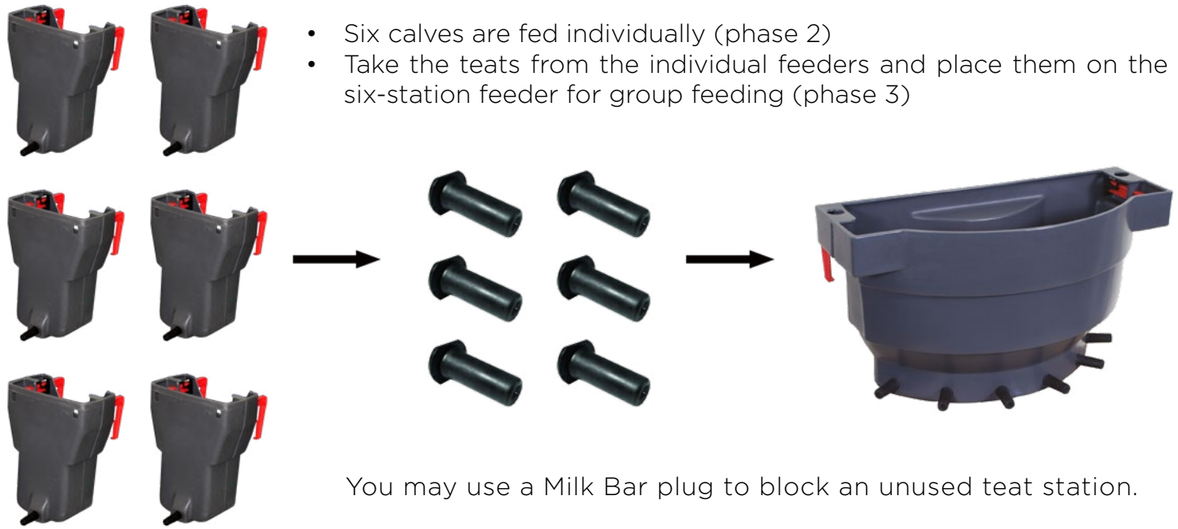
Days 4 to 14 (21 or 28 depending on your system)
The next step is the individual or compartmentalized feeder with a new low flow rate black Milk Bar teat. The hard rubber forces the calf to suckle longer and produce more saliva.

Phase 3: Growth

Day 15 until weaning (22 or 29 depending on your system)
Next, the calf is moved with its black rubber teat to a non-compartmentalized group feeder (6, 10 or 12) with other calves of a similar age. **The calf must keep the same teat until weaning and all calves must be transferred together at the same time.** This way, they will be calmer, and it will avoid group suckling problems.

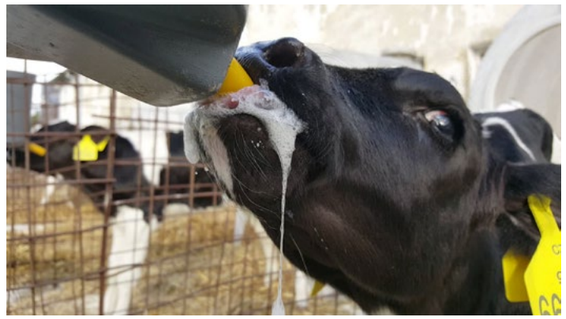
Feeders must be cleaned after each use. The teats must be discarded after the weaning of the calves. Number the feeders in order to use the one matching the calf or group of calves for each feeding.
The Milk Bar method also works if the calves are raised in individual pens until weaning. In this case, use the Milk Bar 1 feeder with the same teat for the same calf until weaning.
Never start Phase 2 with a used teat. Go with a new teat!

Example of the *One calf > one teat > one weaning* method



- Six calves are fed individually (phase 2)
- Take the teats from the individual feeders and place them on the six-station feeder for group feeding (phase 3)

You may use a Milk Bar plug to block an unused teat station.



In this picture, we can see that the calf feeding on a Milk Bar teat produces a lot of saliva with its head in the right position.

EXPERT ADVICE

In cold weather, increase milk volume by 2% for each degree below 5°C (41°F)

Milk volume: 5 litres/day

- at 4°C, increase by 2%: 5.1 L
- at 0°C, increase by 10%: 5.5 L
- at -5°C, increase by 20%: 6.0 L
- at -10°C, increase by 30%: 6.5 L

Milk Bar makes it possible to increase the quantities of milk safely, thanks to the healthy digestive system of the calf.

In summary, healthy calves will ensure the continuity of your dairy cattle herd.
It's a simple process! It only takes good will, adequate equipment, and a little discipline.

Milk Bar™ Teat	Heavy flow teat (with internal valve) or bucket	Results
✓		Good milk curding
✓		Stronger immune system
	✓	Diarrhea
✓		Superior weight gain
✓		Superior adult yield
✓		Replicates natural suckling
	✓	Higher veterinarian fees
	✓	Higher pneumonia risks
✓		Increased saliva production
	✓	Group suckling (high risk of mastitis)
✓		Healthy intestines

THE CALF ENVIRONMENT

Proper suckling is one of the determining factors for successful calf rearing. Habitat (nursery or enclosure) is also to be considered in order to provide a healthy environment for growth. If the calf is cold or not feeling well, it will waste energy to counteract these irritants rather than using it for growth.

Here are some things to consider:

- A calf needs about 1.5 to 2 square metres of space to be comfortable.
- Hutches or pens adapted to the growth stage of the animal must be provided.
- The litter must be dry at all times.
- The calf must have access to fresh water from the first day.
- A drinking bowl with a valve allows access at all times and keeps the floor clean and dry (the Suevia #100.0370 drinking bowl is ideal).
- The habitat must be ventilated but without drafts. Therefore, a good ventilation system is required. In addition, it will keep flies away.
- At Phase 2, groups must socialize. Preferably in a quiet place to avoid stress.

A blanket is highly recommended to keep the calf warm.
If it shivers, it will use its energy to fight the cold rather than to keep its strength to eat and grow.

TEATS AND FEEDERS FOR CALVES

- **Yellow teat for new-born calf***
- To provide colostrum only

#MBCT

- **Regular teat without valve inside***
- No bacterial risks
- The teat follows the calf from day 4 up to weaning
- Recommanded use from 8 to 12 weeks

#MBT

- **Three litres bottle for colostrum**
- For the first 3 or 4 meals

#MBCB

- **One teat feeder with convenient hand grip**
- 3 litres capacity (1 gal)
- Perfect for developing calves
- Fits to 1" (25 mm) rail

#MB1

- **One teat feeder**
- 8 litres capacity (2 gal)
- Ideal for calves in a confined space pen
- **Feeder can hang inside or outside the pen with Ezi Lock hooks (reversible feeder)**
- Dimensions: 11" long x 7" wide x 16" high (18 cm x 28 cm x 41 cm)
- Weight: 1 kg (2,2 lb)

#MB1EL

- **Two compartments feeder of 2,5 litres each (0,5 gal)**
- Ezi Lock hooks
- Dimensions: 16" long x 10" wide x 16" high (40 cm x 25 cm x 40 cm)
- Weight: 2 kg (5 lb)

#MB2C

- **Three compartments feeder of 2,5 litres each (0,5 gal)**
- Ezi Lock hooks
- Dimensions: 20" long x 10" wide x 16" high (50 cm x 25 cm x 40 cm)
- Weight: 3 kg (7 lb)

#MB3C

- **Four compartments feeder of 2,5 litres each (0,5 gal)**
- Ezi Lock hooks
- Dimensions: 24" long x 12" wide x 16" high (60 cm x 30 cm x 40 cm)
- Weight: 3,5 kg (7,7 lb)

#MB4C

- **Five teats feeder**
- 15 litres capacity (3 gal)
- Scale markings at each 5 litres
- Fits to 1" (25 mm) rail
- Dimensions: 11" long x 12" wide x 14" high (28 cm x 30 cm x 36 cm)
- Weight: 2 kg (4 lb)

#MB5

- **Five compartments feeder of 2,5 litres each (0,5 gal)**
- Ezi Lock hooks
- Dimensions: 33" long x 11" wide x 15" high (83 cm x 29 cm x 37 cm)
- Weight: 5 kg (11 lb)

#MB5C

*International patent applications and designs apply PCT/NZ2016/050190

- **Six teats feeder with a 36 litres capacity (8 gal)**
- Ezi Lock hooks
- Dimensions: 28" long x 12" wide x 16" high (70 cm x 30 cm x 40 cm)
- Weight: 3 kg (7 lb)

#MB6

- **Ten teats feeder with a 60 litres capacity (13,2 gal)**
- Ezi Lock hooks
- Dimensions: 33" long x 18" wide x 17" high (85 cm x 46 cm x 43 cm)
- Weight: 5 kg (11 lb)

#MB10

- **Twelve teats feeder with a 90 litres capacity (19,8 gal)**
- Adjustables aluminium hooks
- Dimensions: 47" long x 17" wide x 18" high (120 cm x 43 cm x 46 cm)
- Weight: 8 kg (18 lb)

#MB12

- **Twenty teats feeder with a 120 litres capacity (26,4 gal)**
- Perfect for large pens
- The shape of the base stops calves bunting the feeder over
- Can be used inside or outside. In windy condition, drill a few holes around the base and peg it to the ground
- Dimensions: 34" diameter x 35" high (87 cm x 90 cm haut)
- Weight: 12 kg (26 lb)

#MB20

Abundant saliva in a natural environment and with Milk Bar teat

- **Deluxe Milk Bar™ cart to prepare and transport the milk**
- Double insulated construction to keep the milk at a good temperature
- 125 litres capacity (27,5 gal)
- Automatic safety break when handle is released
- Large and solid all-terrain wheels
- Sight glass with gradients
- 94" hose (2,4 meters)
- Stainless-steel whisk driven by a drill
- Easy to clean
- Dimensions: 39" long x 46" high x 28" wide (1 m x 1,175 m x 0,7 m)

Accessory: flowmeter (sold separately)

Why Deluxe ?
- Pump designed specificaly to ease your work (included)
- Security battery with charging station (included)
- Whisk included

#MBMK125D

- Collar to adapt Milk Bar teat on other brand of feeders (teat not included)

#MBSC21

- Plug to fill a hole with no teat

#MBP22

- Impact-resistant nylon Ezi Lock hooks system, almost indestructible

#MB-ELHS

SYSTÈME DE CROCHETS EZI LOCK (Patent NZ PAT 518590)

Fits feeder on rail

Push hooks to maximum

Feeder holds firmly

Release to remove the feeder

EXPERT ADVICE

After 2 to 4 weeks, élever les veaux en groupe est fortement conseillé pour des raisons de développement cognitif et de sociabilisation. La croissance sera améliorée tout en diminuant grandement le temps de travail. Milk Bar permet le regroupement en toute sécurité et de façon efficace.

TEATS AND FEEDERS FOR LAMBS AND KIDS

Milk Bar also manufacture teats and feeders for lambs and kids. Same quality and same specs as calves products. You must bring the same attention to maximise the yield of your herd.

- **Milk Bar colostrum teat for lambs and kids***
- Made of natural rubber
- Ideal for the first five to six feeding days

#MBLCT

- **Milk Bar teat for lambs and kids***
- Made to imitate the natural teat action to promote a good digestion
- No valve inside so no bacterial risks

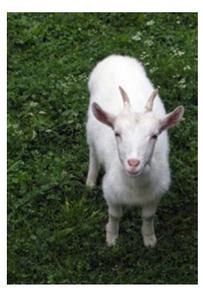
#MBLT

- **Colostrum bottle for the first 3 or 4 meals**
- To use with Milk Bar teat for lambs and kids
- 3 litres capacity (0,6 gal)

#MBLB

- **Single feeder for pen**
- Hooks fits to 1" (25 mm) rail
- 3 litres capacity (0,6 gal)

#MBL1



*International patent applications and designs apply PCT/NZ2016/050190

- **Three teats feeder with convenient hand grip**
- Hooks fits to 1" (25 mm) rail
- 3 litres capacity (0,6 gal)
- Dimensions: 8,3" long x 8,3" wide x 8,3" high (21 cm x 21 cm x 21 cm)

#MBL3

- **Seven teats feeder with convenient hand grip**
- Hooks fits to 1" or 1,6" (22 or 40 mm) rail
- 15 litres capacity (3,3 gal) with scale markings at each 5 litres

#MBL7

- **Ten teats feeder with Ezi Lock hooks**
- Easy to clean
- 60 litres capacity (13,2 gal)
- Dimensions: 33" wide x 18" depth x 17" high (84 cm x 46 cm x 43 cm)

#MBL10

The lamb and kid teat divider is a new, innovative product designed to use Milk Bar teats with automatic dispensing machines.

It took three years of research to optimize the drinking stations of these machines used with Milk Bar teats.

This product has been awarded the Capri d'Or at Capr'Inov 2016 (World Goat Show in Niort, France), the first prize for innovation.

10 ans Capr'Inov
Élu Capr'I d'Or 2016
23 & 24 novembre 2016
Parc des Expositions de Niort www.caprinov.fr

- Teat separator that works with kids and lambs automatic feeders
- Height adjusted to ensure proper suckling action
- Stops animals from biting the end of teat off
- Drastically reduces the number of annual teat replacements
- Prevents milk losses
- Litter stays dry
- Robust and easy to clean
- Dimensions: 29" x 29" (74 cm x 74 cm)

#929500

FARMER TESTIMONIAL

«In 2014–2015, I lost 160 calves, and in the following years, I had a 20% mortality rate. It is a lot of money for me, a grain-fed calf rearer. Following a lecture by Mr. Malard, I decided to try the Milk Bar teats. Since then, I have been a happy rearer! In my last three groups, I only had a 2% mortality rate. This is proof that it works. The equipment and methods are easy to use, and my calves are no longer sick, they look better, and grow healthier. I'm happy with the choice I made and will never look back!» - **Luc Lachapelle, Lachapelle and Trépanier Farm**

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We can also do training workshops at your office, so your staff can take advantage of it.

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