

Primary production of milk

Milking processes

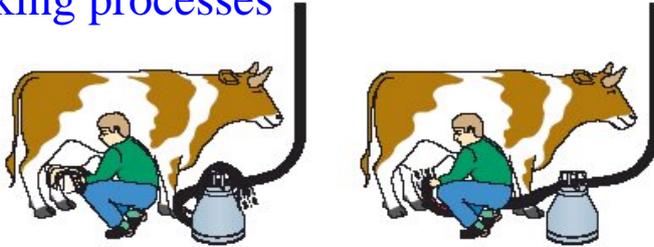


Fig. 3.5 Preparing the cow for milking by cleaning and massaging the udders before the teat cups are placed on the udders.

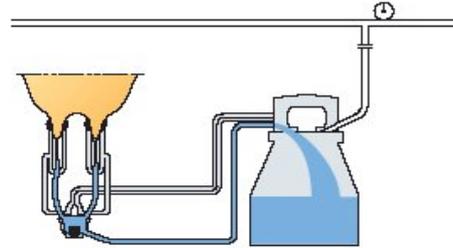


Fig. 3.6 Machine milking equipment.

Hand Milking

On many farms all around the world, milking is still done by hand in the same way as it has been done for thousands of years. Cows are usually milked by the same people every day, and are quickly stimulated to letdown just by hearing the familiar sounds of the preparations for milking. (Fig 3.5) Milking begins when the cow responds with the let-down reflex (as explained in Product Bulletin #1). The first jets of milk enables the milker to detect the status of the udder health.

Two opposed quarters are milked at a time: one hand presses the milk out of the teat cistern, after which the pressure is relaxed to allow more milk to run down into the teat cistern from the udder cistern. At the same time milk is pressed out of the other teat. In this way the two teats are milked alternately.

When two quarters have been emptied in this way, the milker then proceeds to milk the other two until the whole udder is empty.

The milk is collected in pails and poured through a strainer, (fig 3.4) to remove coarse impurities, into a churn holding 30-50 litres. The churns are then chilled and stored at low temperature to await transport to the dairy.

Immersion or spray chillers are commonly used for cooling.

Machine milking

The basic principle of the milking machine is shown in Figure 3.6. The milking machine extracts the milk from the teat

by vacuum. A vacuum pump, a vacuum vessel, a vessel for collecting milk, teat cups and a pulsator are essential parts of the milking machine.



Fig. 3.4 The milk should be poured through a strainer and then chilled.

The teat cup unit consists of a teat cup containing an inner tube of rubber, called the teat cup liner. The inside of the liner, in contact with the teat, is subjected to a constant vacuum of about 50kPa (50% vacuum) during milking.

The pressure in the pulsation chamber (between the liner and teat cup) is regularly alternated by the pulsator between 50kPa during suction phase and atmospheric pressure during the massage phase. The result is that milk is sucked from the teat cistern during the suction phase. During the massage phase, the teat cup liner is pressed together allowing a period of teat massage. This is followed by another suction phase, and so on, as shown in Figure 3.7.

The four teat cups, attached to a manifold called the milk claw, are held on the cow's teats by suction and the friction between the teat and the teat cup liner. Vacuum is alternately (alternate pulsation) applied to the left and right teats or, in some instances, to the front teats. The applying of vacuum to all four teats at the same time (simultaneous pulsation) is less common. The milk is drawn from the teat directly to a vacuumised transport pipe to a receiver unit. An automatic shut-off valve operates to prevent dirt from being drawn into the system if a teat cup should fall off during milking.

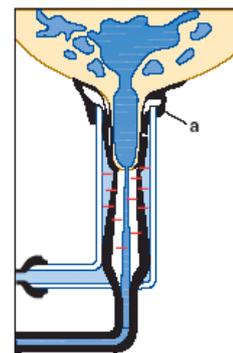
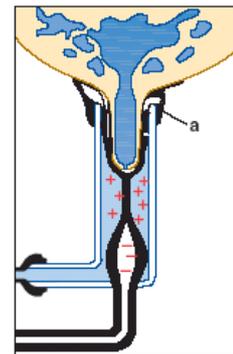
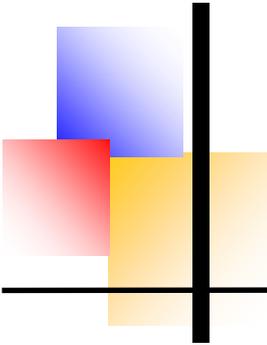


Fig. 3.7 The phases of machine milking.
a Teat cup liner



To eliminate the heavy and time-consuming work carrying filled pails to the milk room, a pipeline system is installed for direct transport of the milk to the milk room (Figure 3.8). **Such systems are most common today.** It allows milk to be conveyed in a closed system straight from the cow to a collecting tank in the milk room. This is a great advantage from a hygienic point of view.

When the cow wants to be milked, she walks to the milking station. A transponder on the cow identifies it, and if the cow was milked recently. She is directed back to the resting or feeding area.

In an automatic milking system the teats can be detected by a laser and vision camera. As an example, the teats can be cleaned separately by means of a teat-cup-like device,

(Figure 3.10), using tepid water applied intermittently at a certain pressure and turbulence to ensure efficient cleaning. Drying of the teats is carried out by compressed air in the same teat-cup.

The teat-cups for milking are automatically attached sequentially. Milk from the four teats is kept separate until the milk meter records the amount from each quarter. Spraying each individual teat with disinfectant is the final stage of milking.

Milk yield, milking duration, milk flow rate, and certain characteristics of the milk are recorded during milking. The fresh milk is forwarded to a buffer tank for cooling before being pumped to the storage tank.

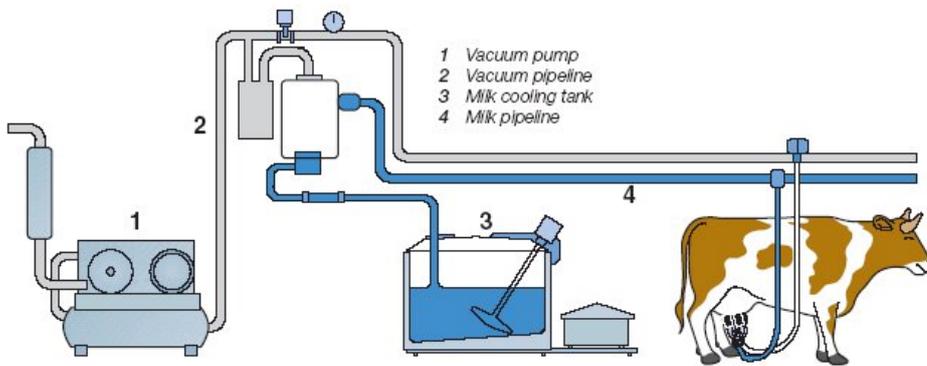


Fig.3.8 General design of pipeline milking system.

Automatic milking Systems

Automatic milking systems, (Figure 3.9), have been installed on commercial farms at an increasing rate in recent years. The potential benefits are reduced labour requirements, higher milk quality, improved animal health and increase yield. Figure 3.11 shows a typical dairy farm layout including an automatic milking system.

In contrast to conventional milking, in which people bring the cows to be milked, automatic milking places emphasis on the cow's inclination to be milked in a self-service manner several times a day. The idea that cows like being milked is very attractive, and one of the main financial benefits from automatic milking is the increase in milk yield from more frequent milking.

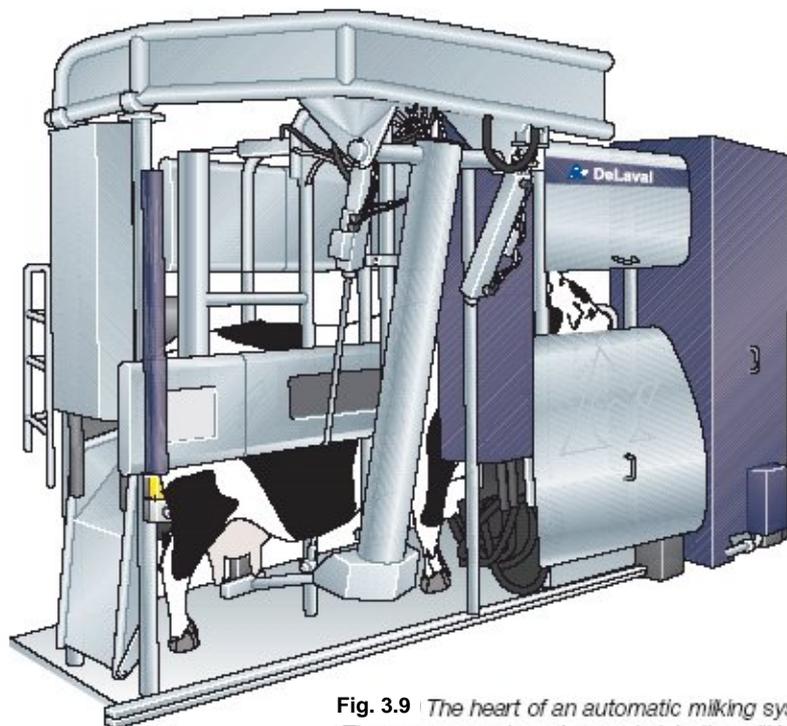
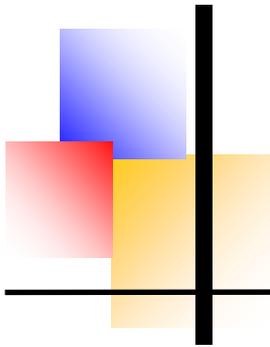


Fig. 3.9 The heart of an automatic milking system. The cow goes when she wants into the milking station where the teats are cleaned and milked.



MilkoPet® Milking Process

The decision to adopt one process from the three milking processes outlined in this Product Bulletin is partly economic, but is also influenced by climate, environmental factors and total farming technologies practiced in each respective world dairy region. MilkoPet® milk is farmed in the worlds largest dairy exporting region where clean, green pastures are provided by stable climate conditions, enhanced by one of the worlds cleanest food producing environments. Where new technologies in farm management practice underpin long term competitiveness, including soil testing, fodder conservation, supplementary feeding, improved animal

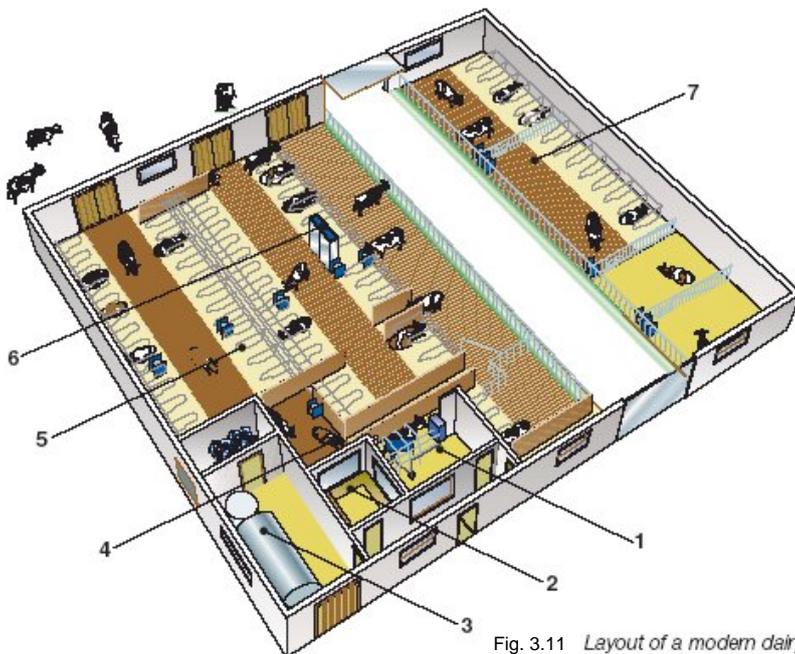
genetics, artificial insemination progress; and use of computers to record and monitor herd health and performance.

Such is our commitment to providing a quality milk product for dogs that we only work with “Worlds Best Practice” farms.

Farmers producing MilkoPet® milk develop happy, contented cows that graze lazily throughout the day in their lush green pastures, and produce high quality milk, measured and monitored against world standards, for milk fats, protein and nutritional content.



Fig. 3.10 Teat-cup for cleaning, drying and pre-milking. The teat is flushed with tepid water for cleaning and finally dried with air. The pre-milk goes together with cleaning water to drain.



- 1 Automatic milking station
- 2 Control room
- 3 Milk cooling and storage
- 4 Smart gate for preselecting the cows attempting the milking station
- 5 Living area
- 6 Feeding station
- 7 Calf section

Fig. 3.11 Layout of a modern dairy farm with an automatic milking system.

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