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Milking Machine Operation

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Milking Machine Operation

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Your milking machine is the most important machine on your dairy farm. Properly maintained and operated it will dependably harvest your milk crop twice each day without damaging your cows. Improperly adjusted and poorly operated, it will waste time, cause udder irritation and reduce your milk checks. To understand correct operation, we must know how a vaccum milking machine operates.

Characteristics of Milking Machines

To a great extent, correct cow milking results from active cooperation between the cow and the milker. Milk is removed from the udder by a combination of pressure inside the udder and vacuum in the teat cups. After proper stimulation and milk let down, the pressure inside the udder increases to about 3 inches of mercury and the milking machine supplies between 10 and 15 inches of vacuum at the teat ends. This vacuum (difference in pressure) causes the teat sphincter to open and milk to flow into the milking machine. Vacuum above 15 inches usually causes irritation and a tendency toward mastitis, while vacuum levels below 10 inches results in slow milking.

The second characteristic of a milking machine is pulsation. Pulsation is the alternation of vacuum and atmospheric pressure between the inflation and the teat cup shell. During the milking phase of each pulsation cycle, vacuum between the inflation and shell opens the inflation and milk flows from the teat. During the rest phase of each pulsation cycle, atmospheric pressure between the inflation and shell closes the inflation. This momentarily stops the flow of milk and allows blood circulation to help alleviate teat congestion.

For clarity, we must understand the meaning of pulsation rate and pulsation ratio. The pulsation rate refers to the number of times the complete pulsation cycle is repeated each minute. This is normally 45 to 70 pulsations per minute. The pulsation ratio refers to the percent of milking to rest time during each cycle. Typically, each pulsation cycle is made up of two equal parts (the ratio is 50:50). More recently, pulsation ratios of 60% milking-40% rest or 70% milking-30% rest have resulted in more rapid milking.

Pointers for Proper Milking

As the flow of milk declines during each milking, the udder and teat tissue begin to be forced into the teat cup. This teat cup "crawl" can shut off milk flow from the udder into the teat. This in turn can cause injury to the delicate tissues inside the teat and at the base of the udder. Teat cup "crawl" can be minimized by:

1. Prompt removal of the unit as milk flow declines. Machine stripping should begin as soon as milk flow is below approximately 2 pounds per minute. The teat cups should be removed when the flow is about 1/2 pound per minute. It will normally not take more than about 30 seconds for machine stripping.

2. Using inflations that are 3/4 inch in diameter. These smaller inflations tend to remain lower down on the teats and thus help minimize teat cup "crawl."

3. Limiting the number of machines used by each dairyman to reduce the probability of over milking and resulting teat cup "crawl." Usually, a good

dairyman will limit himself to 2 units if he is carrying the milk, 3 units in a well designed parlor with a pipeline and 4 units in a highly automated herringbone parlor. For many, this number of units will exceed their ability to milk properly.

In this respect, one should remember that the proper use of each milking unit is far more important than the number of units used and that a good dairyman will be willing to slow down his routine when an individual cow needs special care.

Pipeline and Milk Filter Standards

An integral part of many modern milking machines is the pipeline. A pyrex glass or stainless steel line of 1 1/2 inches in diameter is standard. It should be installed no higher than 6 feet above the level at which the cow stands. It should have a slope of about 1 1/2 inches per 10 feet toward the receiver jar. There should be a 1/32 inch air hole in the breaker cup or claw to allow milk to be pushed up into the pipeline and the milk hose should enter the pipeline in the top half to reduce agitation and foaming. Float separation of the milk and air at the claw has also proven satisfactory.

There are two basic kinds of filter --one is called an in-line filter (it is installed in the milk pipeline and is under vacuum) the other kind of filter is installed somewhere other than in the milk vacuum line.

Outside the line filters include the conventional strainer. It does a good filtration job but it must be checked periodically to prevent overruns. With this filter it is difficult to single out cows that are producing abnormal milk. Another type, the sleeve type filter, fits in the releaser line. It offers good filtration, but again detection of abnormal milk is more difficult.

In-line filters include the disk type. These filters offer good filtration and easy detection of abnormal milk from individual cows, but they can cause large vacuum variations and they are difficult to change. In-line pressure filters are subject to ruptures that reduce their effectiveness. In-line suction filters used ahead of a vacuum bulk tank can seriously reduce the milk line vacuum if clogged and are difficult to change during milking.

In general, the in-line filters appear best when they are used at each individual milking unit. Such filters should be designed so that they can be changed easily during milking. If outside the line filters are used they should be large enough to minimize accidental overflow and more care must be exercised to detect abnormal milk. But, no matter what kind of filter is used, every effort should be taken to adequately wash the udder and to check the milk from each quarter so that a minimum of filtration is needed to produce milk of the highest quality.

Summary

Knowing how your milking machine works can help you use it properly. Cows' udders should be washed and stimulated for at least 30 seconds before the machine is applied. Check the first squirt of milk from each quarter and keep visibly abnormal milk out of the bulk tank. Attach the teat cups as low on the teats as possible and still keep the amount of air drawn into the system to a minimum. Machine stripping should begin when milk flow is down to about 2 pounds per minute and should be limited to no more than 30 seconds. To remove the machine, break the vacuum to the teat cups and remove the teat cups gently. Most cows will milk out in 3 to 6 minutes when they become accustomed to this routine.

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