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Milking technology trends

As well as maintaining udder health and workplace ergonomics, higher throughput of cows and milk in kg/h are in the foreground of milking equipment development plans. The milk producer is supported through the optimisation of technical details and further development of electronic management aids, all helping to maintain good overview, in decision making and meeting increasing mandatory documentation requirements. Electronics can help in the continuous monitoring of milk quality and in operational documentation with the new technologies helping to secure higher standards of food safety.

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Keywords

Milking and cleaning technology, management aids

Sinking milk prices, high investment in buying or leasing quotas and substantial non-family labour costs burden dairy farm income and make these businesses more dependant in the development and application of milking technology innovations.

Energy sparing at the vacuum pump

Frequency controlled vacuum pumps depend on actual vacuum needs and match performance to varying requirements during milking. Applying these new technologies combined with associated cleaning systems can reduce energy consumption by 50%. Especially with robot systems where the pumps work around the clock, frequency controlled vacuum pumps represent a valuable development with the further advantage in the noise reduction they offer, a worthwhile improvement in working conditions during ever-longer milking times.

Highest vacuum pump performance is required in the rinsing phase of circuit washing with traditional systems. Additionally, optimum cleaning of the increasingly-larger milk pipelines must be ensured. For both situations application of a second vacuum pump for the rinsing phase helps to save energy while maintaining performance level

Pulsation and stimulation

Alternating and simultaneous pulsation have both proved themselves whatever the manufacturer, most of whom nowadays are able to set a wide variety of pulsation ratios and milk release phases. All recommend a pulsation ratio from 52 to 62 double pulses per minute at a ratio of 60:40 to 67:33. As well as the fixed pulsation there's also variable milk-flow controlled pulsation. A new pulsation development is individual quarter ratios. Whatever the trend, factory installations in this respect should only be altered together with (DLG) certificated service specialists and associated recording results.

Stimulation is required to encourage cow milk flow and mechanical stimulation aids are to be recommended in association with appropriate milking routine.

Clusters and liners

Cluster design is often based on the different philosophies of the respective manufacturers based on their experience with different breeds and milking routines worldwide. Whether light clusters with plastic cups or heavy ones with stainless steel ones, depends, among other things, on the physical adjustment of the milking plant. The tendency moves towards anatomically-matched clusters capable of handling even highest milk flow without problems. Repositioning of inflow and outflow points on cluster claws ensures maximum throughflow along with gentle milk transport and comfortable handling of the cluster. Claw capacity should be from 250 and 350 ml.

Despite their advantages silicon liners have still not definitely established themselves on the market. Their food safety aspects, longevity and good fitting properties for the most different teat and udder forms are for many milkers still not reason enough to pay the higher price required. The lower price of the traditional neoprene-rubber liner, and developments producing softer rubber, keep the market for these stable. But there's still a tendency to take lightly the observance of exchange intervals for all rubber parts. Liners are the link between animal and machine. Only optimum qualities and characteristics are capable of conveying pulsati-



Fig. 1: The MultiLactor from Siliconform (H 24 St A25) does without a cluster clawpiece (silver medal winner)



Fig. 2: The AktivPuls liner from Happel (H 24 St C21) offers vacuum pressure reduction for teats and was awarded a silver medal

on controlled impulses, felt by the cow, to the teats. Through late liner exchange or selecting wrong or cheap liners, expensive investments in milking technology are rendered useless. If an improvement in milking characteristics is noted after liner exchange then it has to be faced that the exchange was made too late!

Attachment aids and service arms

There's a difference between simple cluster positioning aids and highly developed service arms whereby manufacturers offer very different solutions in the latter. An increasing number of work steps are automated by application of modern service arms capable, apart from optimum positioning of clusters, of easing manual cup attachment. Additionally they can take over the automatic milking-out before cluster removal. In large milking systems applying milking-out aids offer the advantage of reducing total milking time where adjustment is optimal. Control is according to milk flow and, depending on the milking routine and cow milking performance, the milking-out automatic should be activated at a milk flow of between 600 and 1000 ml/min. The difference in flow rates here shows the necessity of individual farm settings.

To avoid blind milking and increase milking performance, automatic cluster removal (ACR) is obligatory in all parlours. New sensors guarantee good and reliable observance of threshold values and times. ACR settings are increasing and rising from 250 to 300 ml/min. As with milking-out automatics, actual settings for ACR should also be matched to the farm situation.

Cleaning technology

Circulation and boiling water cleaning systems have become established although there are always new developments for energy, water and chemicals savings. The system chosen can depend on water hardness and the available electrical power. Generally, manufacturers' recommendations should be observed. Systems with low water and energy requirement and with guaranteed cleaning and disinfection performance should be preferred. Electronic control and monitoring possibilities indicate the most modern automatics and play an increasing role, above all in documentation of the working procedure for quality assurance.

Parlour systems

The success of a milking set-up still depends on the dairy manager and staff's identification with the selected system. Milking time, number of milkers and foreseen farm and herd development must be brought into planning. The herringbone is still top choice in many farms with side-by-side parlours definitely an alternative for growing enterprises. The acute herringbones (50 to 55°) are in the first instance recommended renovation solutions for too-small tandem parlours. Where the herd is expanding the choice should be made between large group parlours with rapid release and carousels.

Swing-over parlours are special solutions with one cluster per two milking places. The system can be fitted in group milking parlours but for an acceptable throughput there should be at least 12 clusters and preferably 16. This then means that more than 24 milking places must be available. The success of the swing-over system also lies with the forced adoption of a consequent milking routine and disciplined milking management.

In the last years, interest in automatic milking systems has definitely risen again and milking robot manufacturers have improved and further optimised technology with innovations and developments focusing on increasing throughput and safeguarding udder health and milk quality. Depending on the farm, the change to milking robots can be the right decision for the future.

Electronic management

Electronic management systems have become established on expanding dairy enterprises but decisions on what information and technology is really needed on the milking place must be based on the actual farming business. A good management programme should fulfil the following criteria:

- Simple user operation,
- Good overview,
- High proportion of automatically recorded data,
- Simple monitoring functions for milking, feeding and cleaning technologies,
- Monitoring of cow performance and behaviour,
- Good selection possibilities,
- Good compatibility with feeding and milking system and selection gates.

Optimising of workplace

Good milking technique demands an acceptable workplace. The ergonomics must be optimised to reduce milker stresses. Milker concentration loss can be minimised through optimum lighting and climate regulation. Another optimisation is required for the light in the milking area and, above all, under the cows with some manufacturers now offering solutions for this aspect.

The workplace is better where the milking floor is level with no steps and direct access into the tank room from where all equipment can be quickly carried into the milking area. Simultaneously the colostrum can thus be comfortably and simply carried out of the area. In big parlours a cellar under the cow stances can offer advantages with safer and cleaner siting for equipment such as milk and cleaning pipelines, flowmeters, pulsators and vacuum lines.