EQUIPMENT SET FOR ACCOUNTING MILK ON THE FARM

B. Korshunov, Ph.D.

A. Uchevatkin, Ph.D.

F. Maryahin, A. Korshunov, Ph.D.

A. Orlov, Researcher

All-Russian Research Institute of Electrification of Agriculture, Moscow

Accounting cow and a group of cows milk - one of the most complex and demanding operations on the farm, the most important condition for the proper organization of production. Information about individual and group udoyah cows needed to conduct breeding and animal production work, determination diet feeding cows, the mode of their content, organization and motivation milkmaids. This ultimately has a direct impact on the quantity and quality of the milk on the farm, and productivity. Specific conditions of livestock farms have specific requirements for measuring devices to account for milk.

According to the technological requirements of individual records must be carried out during control milkings up to three times a month, and records from a group of cows - each milking. It measures the amount of milk produced per cow per day and the average sample selected for the study on milk fat and protein content.

For individual and group account of dairy products using the milk of various types. The main disadvantages of the milk meter used on dairy farms during control milkings and group account are their high cost, large size, complexity washing.

This situation required improvement and creating a new class of measuring devices, free of these drawbacks.

Control flow of milk on dairy farms provides the following operations:

accounting separation of milk at milking a cow udder quarters;

zootechnical records of milk during milking each cow;

accounting flows of milk from cows groups;

general account of the milk coming from milking machine;

account when issuing milk from the farm (commercial accounting).

The purpose of research - development of a set of equipment to control the flow of milk in the vacuum and pressure of the milk, which includes a means of indirect and direct measurement.

By means of an indirect measurement of the amount of milk supplied by the vacuum and pressure of the milk are devices based on the measurement of indirect values associated with the measured amount of milk known functional dependence. Used, for example, depending on defined divider ratio between separated by divider control the volume of milk is sent to the measuring cup and measure the volume, following by vacuum the milk. For this type of device is a device for accounting separation of milk at milking a cow udder quarters, accounting for zootechnical milk and taking the average of the sample during milking.

By means of direct measurement include devices based on the methods of measuring the volume of milk by its direct comparison with the volume of the metering device of the device. As a reference, in this case, the measuring cells are made, which are volumes rigidly bounded on all sides by measuring surfaces.

The system control checkpoint is issued remote electric analog or digital signal proportional to the cross-section through the measuring instrument milk. For this type of device is a device for the group, and general commercial accounting of milk coming from milking system and issued a milk tanker. For these purposes, the means and are designed indirect measurement, including electromagnetic action. They use a functional relationship between the rate of flow of milk flowing through a uniform magnetic field and thought while on set in the flow electrodes of the electromotive force.

In operation, after a random time integration values of the electromotive force proportional to the flow rate signal is generated proportional to the volume of the flowing milk.

On the principle of proportional division of the flow of milk in VIESH created and protected by patents: a device for zootechnical control of milk and sampling during milking UZKM-1 and a device for accounting separation of milk at milking a cow udder quarters URV-.

As a divider used stabilizer random flow of milk. He is at the top of the unit. Random flow stabilizer is designed as a cone, the apex directed to divvy up the stream of milk. The gas-liquid mixture under the effect of the pressure difference created by the vacuum pump acts on the divider cone and under the force of surface tension, the liquid phase in the liquid mixture as a thin film covering a moving conical surface and the toroidal meter. The air is separated and passes through the peripheral channels. Thus, the released liquid component liquid mixture. Part of this component, based on the results of the research, was adopted with the indexing factor K 1:50 "cut" into a film of the measuring gap with thin edges along the edges and is directed into the measuring cup with scale which readings are taken.

Improving the effectiveness of control systems streams of milk on livestock farms requires improved measurement tools belonging to the production lines of processing milk.

As studies have shown, electromagnetic measuring best meets the requirements of the device to control the flow of milk. They have a sufficiently high precision, have no moving parts, accounting allow remote milk, isolated from the environment with minimum contact with the inner surface molokoprovodnyh systems with high quality milk. This increases the speed, weight and overall dimensions and improved cleanability of technological systems of circulation washing.

The results of research. In VIESH an apparatus for differential accounting milk flow UKM-Bq.

The device operates on the principle of measuring the flow rate of milk through the measuring unit of the electromagnetic action with the remote issuing a signal proportional to the volume of milk has passed through the device.

Conducted economic tests have shown the feasibility of using these devices for general registration and issuance of milk from the farm (commercial accounting).

However, to date the electromagnetic measuring means has not been adequately use in production lines for processing milk farms due to the additional processing requirements, are difficult to use when operating in the random flow of milk, the milk in vacuum and low flow rate.

All of these additional requirements are particularly relevant to the group account of milk. A limitation of the existing electromagnetic measurement tools is the need to equip them with high-capacity tanks when working in a milk with random modes milk receipts, including vacuum in the milk, where the milk is in the form molokovozdushnoy mix and ensures guaranteed filling section of the pipe flow transducer, without which no normal operation of the device.

In this regard there was a need for research to develop a comprehensive system of accounting milk on the farm, which provides remote monitoring of flow of milk from a group of cows after milking system and the issuance of the farm (commercial accounting).

In VIESH together with NPO "imager" developed an electromagnetic device that provides accounting random streams of milk, including and vacuum the milk.

The advantages of the developed electromagnetic device for remote monitoring streams of milk on farms are:

• high reliability during operation;

• no wear parts;

• High measuring accuracy;

• Easy operation and maintenance;

• saving the measurement results in the non-volatile memory up to 90 days .;

• the ability to transfer the results to the local network, internet or output to printer;

• Minimal contact area measuring surfaces with the product measurements;

• high speed of operation; improved weight and overall dimensions.

Conclusions

Developed a set of equipment provides a comprehensive account of milk on the farm: individual, with an accuracy of ± 4%; group, with an accuracy of ± 0,81%; with the milking plant, with an error of ± 0,73% and the issuance of the farm (commercial metering), with an accuracy of ± 0,6%. This provides the necessary degree of isolation from the milk of the environment and the smallest area of contact with the

inner surface of equipment to control the flow of milk, which is one of the most important criteria in evaluating the milking equipment.