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General Requirements for Technological Equipment Used in the Packaging of Livestock Products

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Annotation: *In livestock product processing enterprises, it is essential to reduce unnecessary labor, improve working conditions, and ensure product safety by equipping facilities with high-quality packaging machines and equipment. This article presents an overview of the general requirements for packaging equipment used in the storage and processing of livestock products*

Keywords: *Ergonomic, aesthetic, constructive, material, equipment, operational, energy-efficient, magnetic.*

INTRODUCTION

In recent years, a number of laws and decrees have been adopted to ensure the production, storage, and timely processing of livestock products. As a result, it has become essential to properly organize the collection, storage, and processing of these products, to construct modern storage facilities and processing enterprises, and to introduce advanced scientific and technological innovations. Moreover,

it is advisable to study and widely implement the scientific achievements and technological advancements of foreign countries into domestic production.

It is essential to ensure the preservation of high product quality through the use of automated packaging machines, maintaining the specific characteristics of raw materials—such as color, taste, aroma, shape, and size—while meeting food safety standards. Additionally, achieving product standardization and increasing its competitiveness in the global market are required.

Results and Their analysis: Currently, there is a steady increase in the demand for technological types of packaging materials. These types of packaging include multilayer polymer materials, composite materials (such as combinations of polymers with paper, foil, and cardboard), and modified atmosphere packaging.

In accordance with the technical regulation "On Food Safety," packaging safety must be ensured through several key indicators:

Mechanical properties – the packaging must withstand compression, tensile loads, impact, and other physical stresses;

Chemical indicators – the container must be resistant to oxidation and corrosion;

Sanitary and hygienic indicators – chemical substances released from the packaging must not exceed permissible concentration levels;

Sealing strength – welded seams must prevent the penetration of air or moisture

Each type of packaging must undergo a series of tests to ensure its reliability and safety

The general requirements for technological equipment used in packaging are conventionally divided into technological, operational, energy, structural, and economic categories (Table 1).

Requirements for equipment are based on proper operation, the selection of optimal design variants, compliance with industrial safety and sanitary standards, and the goal of reducing production and service costs, among other performance indicators.

Technological requirements for equipment refer to ensuring maximum performance of operating modes, compliance with design parameters, and compatibility of the working chamber structure, loading and unloading mechanisms with the physical and chemical processes of product processing, which in turn should contribute to the improvement of final product quality.

Technological parameters of equipment include operating temperature and pressure, the movement speed of the product through the equipment, and other related factors.

Table 1

General Requirements for Technological Equipment Used in the Packaging of Livestock Products

№	Requirement Type	Indicators
1	Technological	Operating mode. Technological indicators. Structure of the working chamber. Execution of product handling processes (loading, unloading). Compliance with technological processes aimed at producing high-quality products.
2	Exploitation	Ease of maintenance. Low labor cost. Corrosion resistance. Ease of inspection, cleaning, and repair. Continuous and noise-free operation. Compliance with safety and sanitary regulations.
3	Constructive	Compliance with machinery standards. Operational capability. Durability. Long-term operation.

		Suitability for repair. Self-sustainability. Compliance with aesthetic and ergonomic requirements.
4	Energetic	Performing processes with minimal energy consumption. Low energy consumption function. Comparative energy consumption.
5	Economic	Low cost. Comparative productivity. Comparative energy consumption. Metal capacity. Coefficient of useful work. Comparative water consumption.

All technological equipment must be provided with operational and maintenance technical documentation. The exploitational documentation should consist of the equipment's operating manual, safety guidelines, passport (data sheet), and relevant appendices.

The exploitating manual includes information on the design and schematics of the equipment, operational instructions, maintenance guidelines, and other related documents.

The equipment passport confirms the main specifications guaranteed by the manufacturer, including key parameters, descriptions, delivery set, and factory serial number.

The equipment form (logbook) should contain general information about the equipment, operational resource records, a scheduled maintenance and preventive repair plan, and the structure of the repair cycle intervals. This document allows for the tracking of breakdowns, maintenance activities, and repairs over months and years of operation.

These documents must be stored by the responsible person designated by the enterprise manager's order.

According to the general rules of equipment operation, a sanitary and technical inspection must be carried out before use. This includes checking the condition of electrical conductors and grounding, ensuring all moving parts and working units are properly enclosed, verifying the condition of power switches, circuit breakers, magnetic starters, and similar devices; confirming the equipment is securely mounted to the floor or workbench; checking lubrication, individual assemblies and mechanisms, functionality of working parts, and overall sanitary condition. Idle testing should also be performed to ensure proper operation.

Conclusion. The use of equipment is closely linked to the requirements and regulations of technical safety and industrial hygiene. These requirements include ensuring clean air during operation, adequate lighting, and protection against ionization, infrared and ultraviolet radiation, electromagnetic exposure, noise, vibration, ultrasound, electric shocks, electrostatic discharges, as well as extreme temperatures. Additionally, equipment must be safeguarded against mechanical, chemical, and biological hazards. Proper enclosures for machinery, implementation of signaling systems, and the use of color-coded control devices are essential for ensuring safe and efficient equipment operation.

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