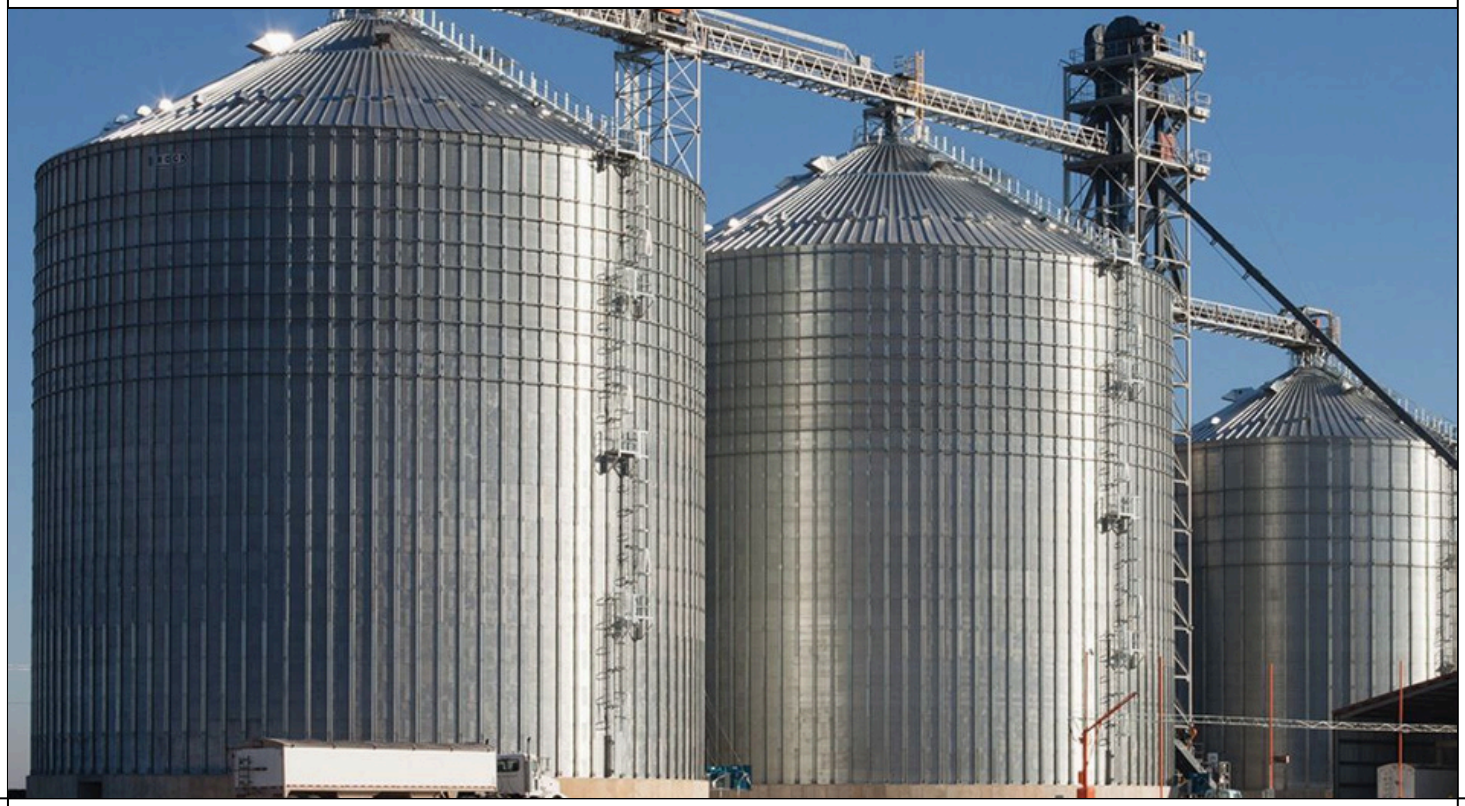
TECHNOLOGY GROUP

GRAIN METHODS



“SKIF TECHNOLOGY GROUP” is actively engaged in the development and implementation of grain storage technologies, which play a crucial role in the agricultural supply chain.

1

Grain storage helps preserve its quality and nutritional properties, preventing spoilage and protecting it from pests, mold, and microbes.

2

The storage system allows for the stabilization of grain supplies throughout the year, helping to avoid sharp price fluctuations and ensuring constant access to the product regardless of the season.

3

Grain storage facilities also play an important role in ensuring food security by creating reserves in case of crop failures or other unforeseen circumstances.

During the processing and storage of grain, a significant amount of dust is generated. Modern aspiration systems and air purification technologies developed by “SKIF TECHNOLOGY GROUP” play a key role in minimizing dust emissions and other pollutants. These innovative solutions not only improve air quality at production sites but also contribute to ensuring worker safety and health, reducing the risk of fires and environmental issues.

METHODS OF GRAIN STORAGE

Grain and seed storage can be carried out in three types of storage facilities: a hangar for floor storage of grain, as well as silos made of concrete or metal. They differ in functionality, and each has its advantages and disadvantages.

1

A floor storage warehouse offers benefits such as a consistent storage environment, minimal mechanical damage to seeds, and the ability to store different batches of raw materials separately. The disadvantages of floor storage include the lack of mechanization for cleaning. In this method, the raw materials are stored non-compactly, taking up large areas. Adequate automation cannot be ensured. Nevertheless, this method is well-suited for long-term storage, especially for corn, seeds, and oilseeds.

2

A concrete silo is a reliable structure for temporary and long-term grain storage. It has a high level of thermal insulation, so the quality of the contents does not depend on weather conditions. These storages are not affected by frequent reloads. However, maintaining such concrete silos is quite difficult. Additionally, the proportion of broken particles increases due to friction against the walls and bottom.

3

A metal silo is the most modern storage container, available in various types and sizes. This storage allows for:

- Equipping storage with various mechanisms;
- Aeration;
- Quality control of storage.

GRAIN STORAGE TECHNOLOGIES DEPENDING ON MOISTURE LEVELS

For those producing pelleted compound feed, it is crucial to determine the moisture content of the raw materials. Based on their condition, raw materials can be classified into:

- Dry
- Moist
- Wet

Depending on the condition of the raw materials, a specific grain storage technology is selected.

- The moisture level in dry grain is below the standard for the crop. Dry mass can be stored in bulk, in a bunker, or preserved. Methods such as aeration, ventilation, sterilization, cooling, and treatment are used to maintain its freshness. Under these conditions, any type of crop can be stored, whether it is for food, technical purposes, seeds, or fodder grain for animal feed production.
- Moist grain has a moisture content that is 2-3% above the standard. It is loaded into a silo or hermetically sealed, with cooling and preservation methods applied. This storage method is used for crops of any purpose, except for seeds.
- Wet grain has a moisture content more than 3% above the normal level. Such raw material is subject exclusively to hermetization, either natural or chemical preservation. It is intended for direct feeding to livestock.

LOSS OF GRAIN DURING STORAGE

Not only does the quality of grain change over time, but also its weight and volume. This is due to moisture evaporation and seed respiration—air exchange that activates biological processes.
Drying and processing can affect weight.

The degree of grain loss during storage varies for different crops; corn experiences the greatest weight loss, about 120 kg per ton over six months.

While for the same period, a ton of wheat loses 70 kg.

METHODS TO MAINTAIN GRAIN QUALITY

Let's consider methods for managing natural processes within a mass of grain. Each method is chosen based on the current state of the grain and the final purpose of the product.

- AERATION
- VENTILATION
- COOLING
- CHEMICAL DISINFECTION
- GRAIN PRESERVATION

METHODS TO MAINTAIN GRAIN QUALITY

Raw materials are self-preserved to save on drying costs. Moist raw materials are preserved using chemical substances.
Dry mass is saturated with inert gases and hermetically sealed. By considering the characteristics of the crop and the state of the grain mass, and applying appropriate methods to enhance the resistance of grain crops, high quality can be maintained for several years.

1 **Aeration.**
Aeration is used in floor storage and involves passive ventilation of the grain storage facility or active airflow management. Its purpose is to clean the air from gases and other decay products (CO, ethylene, water vapor) emitted by the mass. This procedure is especially necessary if the storage facility lacks a ventilation system.

2 **Ventilation.**
Ventilation involves passing air currents through the grain mass to cool or dry it. Ventilation for drying is employed when the actual moisture content of the grain is above the equilibrium level.

3 **Cooling.**
Cooling is the active ventilation with dry cold air aimed at increasing the biological resistance and storage life of the grain, as well as destroying pests and unwanted microorganisms. Mass cooling is achieved by using chilled air or passing the raw material through a cooler shaft of a grain dryer.

4 **Chemical disinfection.**
Chemical disinfection is carried out using active chemicals that kill or suppress pest activity. This relatively radical method is particularly used for seed treatment before planting.

5 **Grain preservation.**
Grain can be preserved in any state — from dried to raw — using chemical or natural preservatives. Natural preservatives include substances formed in the moist mass during hermetic sealing, such as ethanol, carbon dioxide, acids, and ethers. Chemical preservatives include mineral and organic acids, as well as inert gases.