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THE CURRENT STATE OF GRAIN DRYING IN UKRAINE

Summary. *Today one of the main tasks in agriculture of Ukraine is to increase grain production. In this regard, there is a problem of creating the necessary conditions for long-term storage of the crop.*

Key words: *Grain, analysis, grain dryers, technology, methods.*

Grain from the fields can come with different humidity. The most common method of storing grain mass is to store it in a dry state, which necessitates the presence of such an important technological process as drying. In post-harvest processing and storage of grain, drying is the most energy-intensive and expensive process, so the choice of the appropriate method and technology of drying can directly affect the feasibility and efficiency of drying.

The main requirements that a grain dryer must meet are high productivity, environmental friendliness, low power consumption and be quite versatile. To date, drying units are classified according to the following characteristics: air pressure in the drying chamber, for atmospheric and vacuum dryers; heat supply to the grain, for convective dryers; the type of drying agent used in the installation; nature of work (periodic or continuous action); the nature of the drying agent; circulation of the drying agent; the frequency of use of the drying

agent; the method of heating the drying agent; type of drying object; design features [7, p. 142-157; 3, p. 278-281].

In Ukraine, the most common method of grain drying is convective, which involves the transfer of the agent to the grain mass from mobile heat (air, gas, or fuel combustion products). This agent acts as a coolant and moisture absorber, which determines the relative simplicity of this method. The main disadvantage of this method is the low efficiency (25… 40%) [8, p. 72; 10, p. 38].

Drying plants that have become widespread in Ukraine, which are based on the convective method of grain drying - are mine grain dryers. In these installations, the drying takes place due to the heated agent, which is fed in the transverse plane. The movement of grain in the mine is due to its own gravity. The speed of movement is determined by the throughput properties of the exhaust device. Grain dryers of mine type have such basic parameters as: temperature of agent (70-150 C °), decrease in humidity for one cycle, decrease in humidity from 1 m3 of volume of mine from 30 to 45 kg / h. An important advantage of mine grain dryers is the ability to dry the grain mass of any moisture, which can reach 45%, while ensuring a fairly high uniformity of drying. It should be noted that the performance is usually associated with the dimensions of the dryer, namely, the larger it is in volume and height, the greater the productivity. Mine dryers have a fairly significant height, which can reach 20-30 m.

The main disadvantages of mine grain dryers are rather low efficiency, which is equal to 35% in most mine grain dryers; low percentage of moisture removal in one drying cycle of 4-6%, the need for a significant initial investment for their acquisition and a significant area for installation, which makes it impossible to use these dryers in small businesses. Execution of high-volume dryers is quite profitable, as the operating costs of mine dryers are the lowest

compared to traditional dryers of other types, but it does not solve the problems that were mentioned earlier [4, p. 89-101].

During the analysis, it became clear that today most companies use outdated and inefficient equipment when drying grain, in turn, based on the results of numerical analyzes [6, p. 92-123; 1, p. 61; 2, p. 24-56; 5, p. 29-50; 9, p. 28-56], we found that the modern development of science and technology allows us to implement new developments in the technology of drying and disinfection of grain mass using ultra-high frequency electromagnetic fields. The advantages of the method of drying the grain mass using a microwave electromagnetic field, compared to traditional methods, are based on the fact that microwave energy is produced using generators that run on electricity, which in turn is environmentally friendly. This method of drying allows you to accurately adjust the heating temperature of the grain mass by changing the electric field voltage. This method is based on the absorption of electromagnetic energy in dielectrics. The dry component of the grain does not interfere with the passage of electromagnetic waves, as a result, the electromagnetic waves are not absorbed by the dry grain, but are absorbed only by moisture in the wet grain and then only heat and dry the wet grain. The main principle of drying grain using a microwave electromagnetic field is the effect of an intense electromagnetic field of ultrahigh frequencies on the grain, during this process there is a release of thermal energy, while the wet grain is heated from the middle. It should be noted that recently began to create schemes using the microwave electromagnetic field and convective drying method. In the analysis it becomes clear that microwave energy in combined drying methods, acts as an additional source of energy, and convective supply of heat agent is the main.

Based on the facts given earlier, we can conclude that currently the most common drying method is convective, the disadvantages of existing convective grain dryers are low efficiency, low specific moisture removal, uneven drying, high cost of drying agent, high energy consumption. The use of microwave

electromagnetic field drying technology provides a number of significant advantages over conventional dryers that use only a thermal agent. Grain drying technology using microwave electromagnetic fields can be used in combined dryers.

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