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IMPROVEMENT OF MINERAL FERTILIZER PROCESSING EQUIPMENT IMPORTANT FOR AGRICULTURAL INDUSTRY AND IMPROVEMENT OF PRODUCT QUALITY

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ANNOTATION: In order to better mix the material, to increase the contact area of the material with the drying agent, and therefore to increase the heat and mass transfer area and the coefficient of heat transfer from the drying agent to the particles, the dried material, transfer device is installed inside the drying drum. the most commonly used types of internal nozzles are shown. However, a nozzle with an L-shaped profile is often used. This work is one of the first works devoted to the study of material dispersion in tumble dryers. As a result of the study of L-shaped nozzles, we obtained a histogram of the distribution of material in the section of the drum, which was converted into a continuous curve.

KEY WORDS: dryer drum, distribution degree, average residence time, load degree, fall length, mineral fertilizer.

INTRODUCTION

The main purpose of this article is to analyze the mechanical, energetic, process operation mode and other problems of the drum drying apparatus, and research the optimal operation modes in the dryers. In addition, on the basis of the analysis of the work mode, ensuring energy efficiency depends on the work productivity, which means organizing intensive operation of the process. A complete study and analysis of the operating mode of the drying drum. Investigation of mass transfer processes in drum dryers. Increase the surface of contact (contact) between the agent (heat) and the raw material supplied for drying. Placement of shovels (nozzles) at an optimal figure. Carrying out theoretical and experimental studies of drying of dispersed material in the studied machine.

When choosing a drying method, it is necessary to take into account the weight of each parameter for the specific material and the characteristics of the material to be dried. The drying process is monitored by the thermal effect of the environment material therefore, an excessive increase in the drying temperature has a negative effect on the quality of the product. In addition to the temperature, the organization of quantities in the dispersed and gas phases is important. The most favorable conditions for the interaction of the phases are the corresponding compression in direct flow dryers, that is, the gas is connected to the wet cold material at the maximum temperature, which causes it to heat up to the temperature of the wet thermometer. By the end of the process, the gas is sufficiently cooled and the dry product is prevented from heating up from the required high temperature. With proper mixing, the temperature of the gas quickly decreases to a constant minimum, and at first glance, it creates favorable conditions for its initial temperature increase. However, during recirculation of the material, the dried particles will enter the hot gas inlet zone many times and cause overheating. Therefore, it is necessary to lower the temperature process when drying thermo sensitive materials or high requirements for product quality. The heating of the phases is high in the direct flow movement, where the hot gas and the dry product are connected at the maximum temperature. Therefore, it is effective to use countercurrent current for drying heat-resistant materials, which require deep drying. In some cases, when drying unstable materials, it is useful to cool the product after leaving the dryer, but during the drying process of some materials, heat treatment leads to the formation of new properties required for the dried product. In recent years, heat pump devices have been widely used in drying technology. Heat pump devices work in the same way as cold compression devices according to the

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thermodynamic chain. In the heat pump, the mechanical consumption of the used drying agent with the heat of the external environment moves from the low temperature potential to the high temperature stage of the drying agent in the compressor. On the other hand, the most popular and common way is dry liquid materials. So, we can add that to dry liquid materials, it is necessary to create specific hydro dynamic conditions, that is, spraying, distribution with a thin layer, mixing in a certain volume, formation of a foam layer, etc. In addition, there should be a combination of application and scattering of a thin layer of liquid material on the surface of dried granular material or inert bodies in granulator drying drums. Drying of the foam layer is carried out in foam dryers, which are used in the food and dairy and meat industries. Due to the necessary large amount of moisture evaporation, it leads to an increase in heat transfer and heat energy consumption, which in turn leads to an increase in the size of drying devices, as well as an increase in the cost of the used drying agent in the cleaning system. In addition, during drying of liquid materials, it leads to the formation of product fragments with a morphological structure, and during spray drying, it is characterized by the formation of dust. Through these specific features, it is possible to develop and perfect the equipment and technology for drying liquid materials, the maximum energy saving, intensification, solving the problem of air purification from dust and the finished product with the desired dispersion and structure during the drying stage. Leads to the formation of varnishes. In many cases, it will be possible to find a complex solution to the questions. Atmospheric or vacuum dryers with high economic efficiency stand out, but their use is limited and low-production and depends on the characteristics of drying facilities. The same can be said about rotary and screw dryers. Spray dryers are universal and practically designed for various types of liquid flowing drying objects. Another interesting thing about that field is apparatus for drying in a stationary layer. In the drying zone, there are large classes of dryers that dry the dispersed material in a still, low-motion or slow-moving zone. The distinguishing features of the dryers belonging to this class are that they have a chamber with a circular cross-section or a right angle, so these dryers are also called chambered. Chamber dryers can be divided into shelf, shaft, tape types according to their structure. Regular chamber dryers in periodic motion are shelf dryers, so they are also called drying cabinets. Chamber shelf dryers are used for drying materials characterized by a continuous process or a complex individual mode in low-ton production. There are many types of dryers with a large number of schemes and shelves that separate air movement and multiple circulations. It is used for drying loose, lumpy and pasty materials from turbine dryers.

Information on the amount of solids carried up by the nozzles and then sprayed is essential for the dryer to operate within the optimum loading range. Researchers recommend choosing the volume of solids in the range of 10-15% of the total volume of the drum and the shape and number of nozzles in accordance with the operating conditions of the dryer for optimal performance of the drum. If the drum load is less than the limit of this range, the dryer will operate below its capacity, inefficiently. On the other hand, if the material drum load is more than the limit of the range, excess material accumulates in the dryer, which shortens the time of drying materials in the machine. As a result, a part of the material may not be dried to the required moisture level and may have a negative effect on the quality of the final product. The amount of solids in each nozzle depends on its geometry, the angular position of the nozzle inside the drum and the characteristic angle formed between the angle of free scattering of solids and the horizontal, which is also called the natural slope angle. Professors Schofield and Professors Glikin note that this angle can be determined by the balance of gravity, centrifugal force and frictional forces acting on a particle about to fall from the nozzle. Thus, the authors proposed an equation to calculate the natural slope nozzle.

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It should be noted that the equation was only tested for solids at constant moisture content, which does not fully correspond to the actual drying process. Because moisture is lost as the solid moves through the dryer, this must be taken into account before using the equation to design actual dryers. If the natural slope angle of the material is known, and the angular position of the nozzle on the inner circle of the dryer is known, it is possible to calculate the cross-sectional area filled with material for nozzles of any shape. In this case, the amount of material in the nozzles is determined by their geometry, angular position and natural slope angle of the material. Professor R. J. Tojiev and his students analyzed the negative state of material distribution in the cross-section of the drum surface in a dryer equipped with a L-shaped profile. Researchers note the following negative consequences: First, due to the uneven distribution of material from the nozzles in the dryer, open areas are formed in the rain of the product distributed along the cross-section of the drum. The formation of this open zone helps the free flow of hot air through this zone, which reduces the amount of heat received by the material to be dried and reduces the intensity of the drying process.

CONCLUSION

As a result of the conducted research, the mode of low energy consumption of the device was determined. The coefficients of the equation necessary to determine the amount of power used were determined experimentally. Depending on the obtained proportions, the drying time of raw materials can be delayed in this device.

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