Innovative: International Multi-disciplinary Journal of Applied Technology
(ISSN 2995-486X) VOLUME 02 ISSUE 02, 2024

DRYING POTASSIUM CHLORIDE

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Abstract:

Auxiliary processes in beneficiation of sylvinite ores, i.e. drying of potassium chloride, drying types, and equipment are presented.
Keywords: sylvinite, enrichment, filter, dryer, fan.
Аннотация: Представлены вспомогательные процессы при обогащении сильвинитовых руд - сушка хлорида калия, виды сушки и оборудование.
Ключевые слова: сильвинит, обогащение, фильтр, сушилка, вентилятор.

Drying of potassium chloride According to Ctandart requirements, the moisture content of KCl in any volume should not exceed 1%. For this, the moisture content of the product coming out of the centrifuge is 5-7%, and the moisture content of the flotation KCl coming out of the drum vacuum filter is 9-12%. The moisture content of KCl granulated by the pressing method is required to be less than 0.5%.

Currently, 3 types of devices are used for drying KCl: drum; abstract fluidized bed, and pneumatic dryers. Figure 4 shows a typical system of a flotoconcentrate drying unit equipped with an abstract fluidized bed dryer. For all types of dryers, fuel-burning, and smoke gas cleaning systems are the same. Large-fraction wet float concentrate is fed from hopper 10 to loading device 8 using a belt conveyor 9. The blade axis of this device rotates at a frequency of 4 s -1 and spreads the material evenly over the abstract boiling layer. A similar device loads the KCl crystals into a tube dryer. The material with a moisture content of less than 0.5% is transferred to the cooler 13 using the pouring device 12. The temperature of the dried material coming out of the dryer is 1400 C.

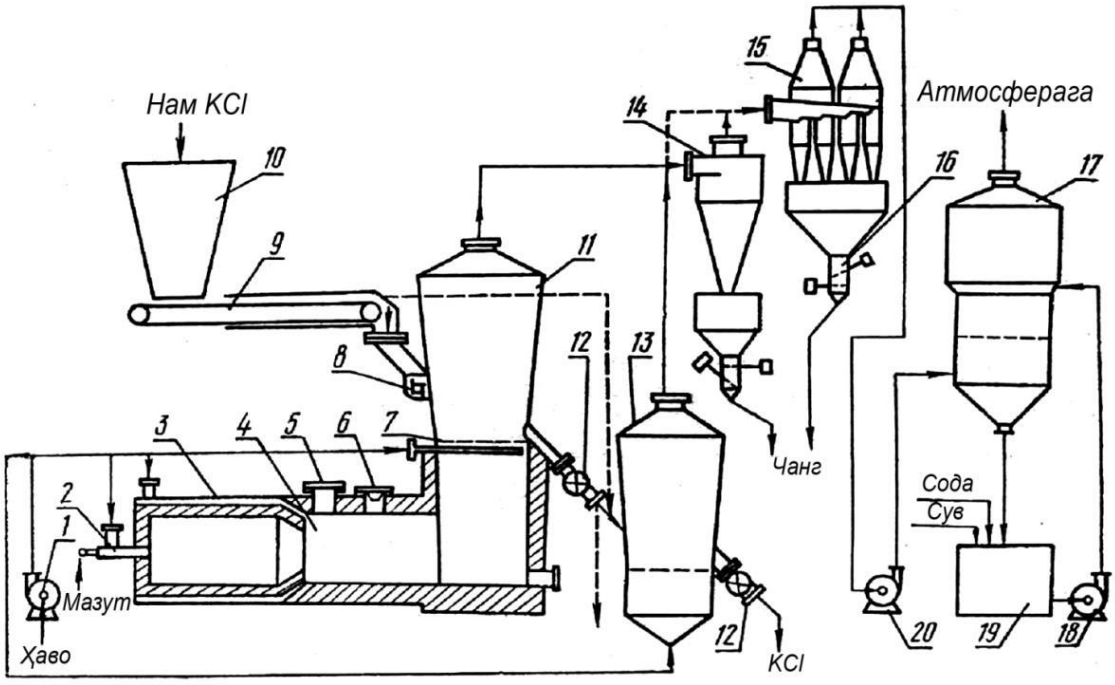

Figure 1. The system of the drying section

1-fan; 2nd sprayer; 3 firehouse chamber; 4-mixing chamber; 5-reservoir valve; 6-burning valve; 7-distributing hole grid; 8-loading nozzle; 9-tape transmitter; 10-wet salt bunker; 11-abstract boiling layer fireplace; 12-drainage nozzle; 13-refrigerator; 14th cyclone; 15-battery cyclone; 16-sprinkler-screw; 17-foam cooler; 18-centrifugal pump; tank 19; 20-smoke hood.

For efficient use of heat and transfer of material temperature to cooler, wet floto concentrate is added to it. KCl coming out of the refrigerator with a moisture content of 1% and a temperature of 40-600 C is transferred to the finished product warehouse.

The heat for the dryer is obtained by heating the fuel in the firebox 3. To burn fuel oil and reduce the temperature of flue gases to 600-9000 C, air is blown using fan 1. In addition, a part of the air supplied by the fan is sent to the grid with distribution holes 7 and to cool the dried finished product in cooler 13. In chamber 4, both flows are combined, and the temperature of the flue gases decreases to the required level, that is, it decreases to 800-9000 C in the drying tube, to 650-8000 C in the drum dryer, to 600-7000 C in the abstract fluidized bed dryer.

The flight of solid particles with flue gases depends on their size and the speed of the gas flow. Depending on the amount of dust in the used gases, 2nd or 3rd stage cleaning methods are used. The flue gases for drying the coarse-grained floto concentrate are cleaned in battery cyclone 15 and foam scrubbers and then vented to the atmosphere. During dehumidification of fine-grained flotoconcentrate abstract fluidized bed dryer or pneumatic dryer of crystalline KCl, up to 10-20% of the product is removed with off-gas. Therefore, two-stage cyclones (14, 15) and a foam washer 17 are used to capture product particles. When drying fine-grained products, the cooling device is not included in the technological process system, because high-temperature small fractions are transferred to granulation. Fuel oil (which must contain less than 3% sulfur) is burned to obtain high-temperature flue gases, and up to 0.3% SO2 is required. During the drying process of MgCl 2 hydrolysis technology, hydrogen chloride is formed. The concentration of NCl in flue gas is one hundredth (1/100) percent but exceeds the norm of standard requirements. Therefore, it is necessary to separate the dust of chlorides that have not been cleaned in a cyclone, as well as gases containing hydrogen

chloride and sulfur from the composition of the used gas. Often, to separate these components, a centrifugal pump 18 uses a foaming, two-stage washing device 17 that sprays a soda solution in a tank 19.

The solution in which the salt accumulates over time is extracted and discharged into the sewer or used in another process. Compact and efficient Venturi scrubbers for gas washing and cleaning, combined with VTI centrifugal scrubbers, are used in the technologies of newly built enterprises.

The coefficient of consumption of raw materials, materials, and energy for the production of KCl by galurgical method is presented in the table, the separation of KCl into the product is 85.9%, that is, 2-5% more than the extraction of KCl by the flotation method.

In summary, it can be said that the greatest loss of KCl occurs during transportation, loading, and packaging processes. However, these losses can be reduced to minimum amounts. In the galurgical KCl extraction technology, since the melting process is carried out at 100-1100 C and the solution cooling process is carried out at 20-250 C, the consumption of water and steam is very large. The heat of water vapor is lost at various stages of the process in the following amounts, namely:

1. With the removal of halite.
2. With a cloudy slurry
3. With water in mixing condensers

It is clear from the given data that these losses occur during the vacuum crystallization process associated with the production technology.

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