

DISCUSSION ON THE WAY OF SAVING ENERGY, REDUCING CONSUMPTION AND INCREASING PRODUCTION IN VACUUM SALT

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Abstract: The methods, means of energy saving and reducing consumption of Xinjiang salt companies and the results it achieved in vacuum salt was described in this paper.

Key words: Vacuum salt; energy-saving; reducing consumption; increase production

1 INTRODUCTION

Increasing the efficiency of energy utilization, speeding up the transformation of enterprises toward energy-efficient is the eternal theme of sustainable development of enterprises. In recent years, Xinjiang Salt Co., Ltd. has achieved good results through continuous efforts to increase the technological transformation of the vacuum salt, adjust product structure, actively organize the combination of production and research. In this paper, some experience about the energy saving and consumption reducing was described.

2 PRODUCTION CAPACITY AND THE INTRODUCTION OF ENERGY CONSUMPTION

Xinjiang vacuum salt mainly focuses on the exploitation of lake salt, halite, and Solar salt making, its industrial capacity is 2 million tons of salt. It has 5 sets of vacuum salt equipment with production capacity of 250,000 tons of refined iodized salt and sausage casing salt. In the period from 2005 to 2007, two sets of vacuum devices with an annual output of 50,000 tons of salt was set up, the evaporator equipped with outside heating reverse cycle axial feed process equipment which made of the 316L stainless steel and titanium alloy heating pipes. In recent years, the effect of improvement on the quality of products through the energy saving is obvious. The detail as Table 1.

Table 1

	NaCl %	size (0.15-0.85) %	coal (kg/ton salt)	KWh/ton salt
Before	98.8	75	230	80
After	99.5	97	153	60

3 THE WAYS OF SAVING ENERGY AND REDUCING CONSUMPTION

3.1 Enhancing the efficiency of heat transfer of thermal system

3.1.1 The emissions of non-coagulated gas

The concentration density of non-coagulated gas in heating chamber affects the heat exchange efficiency between the steam and medium directly, and the efficiency of heat transfer affect the yield of evaporation crystallization. The decrease in heat transfer efficiency of any effect of

multi-effect evaporation will hinder the heat transfer between effects of the whole system. Taking the evaporation with four effect as an example. The pressure of non-coagulated gas in heating chamber with one effect and two effect is positive, so the gas can be emptied successively. However, the pressure of non-coagulated gas in heating chamber with one effect and two effect is negative, the gas can be discharged with the help of vacuum condensation system. Due to the long length of the pipe, small pressure difference, the discharging of the non-coagulated gas is not smooth. In order to improve these shortcomings, the oil temperature cooling water in the centrifuge was used to exchange heat with non-coagulated gas with one effect and two effect. Improving the emissions technology of non coagulated gas based on the siphon principle. The improved technology can not only discharge the non-coagulated gas, but also reclaim the steam heat of non-coagulated gas.

3.1.2 The of the condensate water in heating chamber

The trans-permutation control in every effect heating chamber is controlled by adjusting the opening of valve. too big in the flow rate will cause the connection of steam, and tow small in the flow rate will cause the accumulation of condensate water in the heating chamber, leading to abnormal fluctuations in the every effect temperature and decline in heat transfer efficiency. In order to enhance the operation, installing the display devices of liquid level on the condensate pipe to perform the displaying operation control and improve the operability.

3.1.3 Increase the efficiency of brine heat exchange of the evaporator

Heat exchange efficiency of brine heating evaporator is proportional to the brine flow in the heating pipes of heating chamber, excess flow rate of brine will cause boiling in the circulating tube and crystallization on the surface of tube. Besides, if the rate is too small, it will result in crystallization and scaling on the tube wall. Which will block the tube. Without the above situation and the overloaded of motor, the increase in system capacity and decrease in energy consumption will be achieved by increasing the circulation flow rate.

3.1.4 Improve the heat loss of brine purification

Xinjiang vacuum salt obtain the brine mainly by the way of dissolution and purification of lake salt and rock salt. The condensed water of 2-4 effect was used for dissolving salt. While the insulation measures have been taken on the process of dissolution, purification, storage of salts, the heat loss on the process of cooling is still high due to the cold climate that the lowest temperature even reached minus 30 degrees. Temperature of the heat loss is still large. In order to reduce the heat loss, the plate heat exchanger was adopted. Perform the heat transfer between 2-4 effect condensate water and brine at first, so that condensed water experience the heat exchange at first and then dissolve the salt. Thus, the temperature of the feeding brine increase by 30 degrees relatively, which made an effective improvement on the heat loss of Brine purification.

3.2 Improve the operability and stability of Process Control

3.2.1 Liquid Level Control of Evaporator

With the rapid development of Automation control technology, various types of intelligent control instruments, sensors, actuators have been applied to automatic control in the vacuum salt system, replaced the traditional manual control operation and improved the control accuracy. However, the applicability should be taken into full account on the process of device selection. Unsuitable Automation control instruments may give rise to some problem on the process control.

3.2.2 Alteration of Fluidized-bed wet salt drying Machine

There exists a general problem of Fluidized bed dryer that the salt incrustation is prone to occur on the feeding side of the fluidized bed surface, resulting in the stop of fluid bed boiling and accumulation of wet salt. The production process is necessary to stop to clean-up, which seriously affecting the continuity of the production. In response to these drawbacks, the stuff distribution equipment was equipped through the organization of technical research. It achieved good application result on the process of

long-term operation, extending substantially the cycle of continuous operation of fluidized bed.

3.2.3 Improvement of crystal size

Small particle size affects not only the product quality, but also increase the viscosity of evaporation solution, reduce the solution evaporation efficiency and productivity. At the same time, a large number of dust generated on the process of dry and collecting cause the waste and pollution of the environment. According to the crystallization mechanism of inorganic crystal, the crystal growth rate on the evaporation process is inversely proportional to the number of nuclei. Broken abrasion induced by the operation of pump and collision abrasion induced by fluid

movement generated a large number of secondary nucleation. Based on the above mechanism, the emergence of secondary nucleation was reduced by adjusting the rotational speed of circulating pump and salt pump. In recent years, relied on the combination of the production and research, the great improvement have made in the particle size, the product particle size has reached 97%.

4 CONCLUSIONS

Tapping the full-potential of every aspects of the system to save energy, reduce consumption and increase production is way to speed up the transformation of the enterprises toward energy-saving company, it is also the eternal theme of sustainable development.

MINING OF ROCK SALT AND UTILIZATION