

15. WEEK

DRYING

Stage of the Drying Process

During the drying process there are four basic drying processes:

- ❖ **Setting process**
- ❖ **Constant speed process**
- ❖ **The first decline of drying rate**
- ❖ **The second decline of drying rate**

➤ Setting process :

When a certain amount of airflow is passed through the humid substance to be dried, a part of the heat energy given by the heating air to the substance to be dried raises the temperature of the material surface while the other part is used as latent evaporation heat. In this process, the rate of drying is low.

➤ Constant speed process :

In this process, the transfer rate of the heat energy to the drying air is equal to the evaporation rate. The drying rate determines the difference between H_m and H_h .

$$\frac{dW}{dt} = kA(H_m - H_h)$$

➤ The first decline of drying rate

As the material continues to flow at constant speed, the moisture content of the material decreases due to drying, and the moisture inside the material is no longer diffused into the outer surface to form a continuous liquid media layer. Dry spots sometimes form on the drying surface.

➤ The second decline of drying rate:

Now the dry spots have begun to multiply and expand. At the outermost, there is a layer of dignity. If a dry layer with low heat permeability is to be formed, the rate of drying gradually decreases with the decrease of the diffusing speed of the surface to be transported to the surface.

► At the last stage evaporation has stopped completely. Because the vapor in the dryer air is equal to the vapor pressure in the vapor with the vapor in the material and the drying ends.



Main Parameters Playing in the Selection of Drying Method

- ▶ **Drying properties of the material**
- ▶ **Properties of dry matter obtained**
- ▶ **Properties related to drying process**
- ▶ **Working conditions of the appliance**