

Introduction to Thermal Vacuum Freeze Drying

VACUUM FREEZE DRYING is a technique used by Interior Vault for drying books, documents, photographs, and other porous materials affected by water and/or moisture.

THERMAL VACUUM FREEZE DRYING removes moisture from the frozen materials through sublimation. Sublimation converts water once frozen directly to a gas by bypassing the melting phase. By introducing and controlling the temperature of the heat, we are able to increase the speed to which the sublimation occurs without negatively affecting the product.

The Thermal Vacuum Freeze Drying chamber operates under a complete vacuum, with a temperature inside the chamber operating at -50 degrees celsius. As the pressure in the chamber approaches the vapour pressure of the ice, sublimation increases and the drying process begins. During the Thermal Vacuum Freeze Drying process, water vapour is removed from the materials in a gaseous state and attaches itself to the condenser coils within the chamber, forming ice.

Depending on the degree of moisture in the materials and the amount of materials within the chamber, the Thermal Vacuum Freeze Drying process can take anywhere from 14 - 28 days. After the materials are determined to be dry, the chamber is defrosted.

It is important to note that the timeline between the materials getting wet and being frozen will determine the condition of the materials after Thermal Vacuum Freeze Drying.

It is imperative to have the materials frozen as quickly as possible to limit the degree of damage and reduce the need for additional processing after the Thermal Vacuum Freeze Drying stage.



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