

## Freeze Drying

The application of freeze drying for specimen preparation for TEM and SEM is a well established practise. The aim is to reduce the distortion which occurs when a wet specimen dries by normal evaporation. The distortion is due to the forces of surface tension within the specimen during the change from a liquid to a vapour phase such as water to water vapour, commonly the situation in a biological specimen. However, if the specimen is frozen and retained in the frozen state, then the application of a vacuum will achieve a situation where the water can be removed by sublimation from the ice avoiding the liquid phase and reducing the distortion. The rate of sublimation is very much a function of temperature and vacuum plus the associated drying time, which is in the order of several hours longer. Ideally freeze drying should be carried out at temperatures below the recrystallisation of ice, but this would require an inordinately long drying period. In practise, temperatures of  $-60^{\circ}\text{C}$  have been found to give acceptable results under vacuums achievable with two stage rotary pumps. Good, fast freezing of the specimen initially is a prerequisite to any low temperature biological specimen preparation.

### K750 Freeze Dryer

The K750 Freeze Dryer operates at rotary pump vacuum using a 'Peltier' Thermoelectric stage, with drying temperatures of the order of  $-60^{\circ}\text{C}$ , with back-up water cooling at a nominal  $15^{\circ}\text{C}$ . Both the temperature and the time can be preselected and then the drying cycle will be completed automatically. Provision is made at the end of the drying cycle to allow the specimen to assume room temperature, or be subsequently warmed prior to embedding. Disposable desiccant containers are located in the preparation chamber to enhance the water vapour removal, and with a suitable container the vacuum chamber can be utilised to prepare liquid nitrogen slush for specimen freezing should this be desired.

#### Features:

Thermoelectric cooling and heating	Automatic drying cycle
Convenient to use cold stage	Modular control electronics
Accurate temperature and time monitoring/control	Clean line design

#### Specifications:

*Instrument case; 450mm W x 350mm D x 175mm H Work chamber; Borosilicate glass 165mm  $\varnothing$  x 125mm H Weight; 18Kg Specimen stage;  $-60^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  Temperature controller & monitor;  $-90^{\circ}\text{C}$  to  $+90^{\circ}\text{C}$ , display resolution to  $0.1^{\circ}\text{C}$  Timer; 0 to 999 hrs Services; Water cooling at normal  $15^{\circ}\text{C}$  Vacuum pump; No 5 rotary 85l/min (20Kg)*



**F500** K750 Freeze Dryer 220/240V 50Hz

**F500/1** K750 110/120V 60Hz