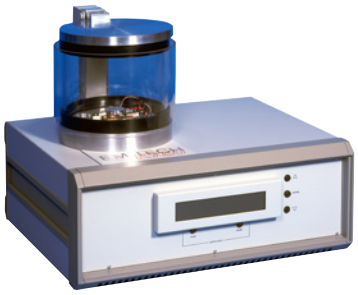
K750X Peltier-cooled EM freeze dryer Specification



Key features

- Thermoelectric cooling and heating - accurate temperature control
- Peltier cooling/warming stage – simple and convenient to use
- Menu-driven operation – intuitive, easy to set up and run
- Automatic drying cycle – unattended operation

Quick overview

The K750X EM freeze dryer operates at rotary pump vacuum using a 'Peltier' thermoelectric stage. This means drying temperatures of down to -60 °C can be achieved, enabling careful sublimation of frozen specimens under vacuum.

The freeze drying method

Freeze drying specimen preparation reduces the distortion and shrinkage effects that occur when a wet specimen dries by normal evaporation. Distortion is due to the forces of surface tension that occur when going from a liquid to a vapour phase, such as from water to water vapour - the normal situation with biological specimens.

The freeze drying method overcomes this problem by careful sublimation of frozen specimens under vacuum - a process that avoids the liquid phase and thereby reduces distortion effects. The rate of sublimation is a function of temperature and vacuum, with typical drying times being several hours or longer.

Specification K750X	
Instrument case	450 mm W x 350 mm D x 175 mm H
Instrument weight	18 kg
Work chamber	Borosilicate glass 165 mm Ø x 125 mm H
Safety shield	Polycarbonate cylinder
Timer	0 – 999 hours
Specimen stage	-60 °C to +60 °C
Temperature controller and monitor	-90 °C to +90 °C, display resolution 0.1 °C
Vacuum gauge range	Atmosphere to 1×10^{-2} mbar
Vacuum pump	90 l/m or greater (see EK3180). (order separately)
Water cooling	Water cooling at nominal 15 °C (E4860 recommended)
Electrical supply	230 V/50 Hz (6 A maximum including pump), 115 V/60 Hz (12 A maximum including pump)
Supplied with	Vacuum hose and connectors, moisture trap and operating manual

Achieving results

Ideally, freeze drying should be carried out at temperatures below the recrystallisation point of ice, but this would require very long drying times. In practice temperatures of -60 °C (if back-up water cooling at 15 °C is used – see E4860 option) have been found to give reasonable results under vacuums achievable with two-stage rotary vacuum pumps.

For certain applications, however, it is necessary to dry at temperatures below -80 °C with lower sublimation rates for delicate specimens. This requires better vacuum than can be obtained using a rotary vacuum pump alone and the lower temperatures associated with liquid nitrogen. For such applications, the K775X is recommended.

Technique

Both the temperature and process time can be preselected and the drying cycle completed automatically. Provision is made at the end of the drying cycle to allow specimens to be warmed prior to embedding.

Disposable desiccant containers are positioned in the preparation chamber to enhance water vapour removal. Additionally, with a suitable container (eg a polystyrene pot), the vacuum chamber can be used to prepare 'slushy' liquid nitrogen for fast freezing specimens prior to freeze drying.

Ordering information K750X	
EK3145	K750X Peltier-cooled, rotary-pumped EM freeze dryer
Requirement	
EK3180	RV5 90 l/m Edwards rotary vacuum pump with oil mist filter options
Options	
E4860/24 V	0.2 HP recirculating heater/chiller (400 W) with high pressure pump
E4860 /110 V	As above but for 110 V operation
EK4180	Stand-alone liquid nitrogen slusher, including polystyrene pots Note: separate rotary pump required (see EK3175)
EK3175	RV3 30 l/m Edwards rotary pump with oil mist filter (for use with EK4180)

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