



K775X Liquid Nitrogen Cooled, Turbo-Pumped EM Freeze Dryer

Quick Overview

The K775X can operate at temperatures down to -140°C and uses a turbomolecular pumping unit, backed by a rotary vacuum pump.

Key Features

- * **Turbomolecular pumping** - for critical freeze drying applications
- * **Liquid nitrogen fed cold stage** - temperatures below -80°C can be achieved
- * **Programmable multi-segment sequence control** - 10 times and 10 temperatures for versatile automatic operation
- * **Accurate time and temperature monitoring** - for pre-selection of drying cycle
- * **Three-year warranty**

Product Description

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.

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 have been found to give reasonable results under vacuums achievable with two-stage rotary vacuum pumps. For these applications see K750X.

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

The K775X Freeze Dryer achieves low temperatures by using a liquid nitrogen cold stage - fed from an integral vacuum dewar which is capable of giving several hours holding time between 'top ups'. For extra convenience and extended drying periods, an optional 'auto top-up' system - consisting of a level sensor and free-standing 30L or 60L pressurised dewar - will allow several days unattended operation.

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Pre-frozen specimens are loaded onto the cooled stage of the drying chamber through the lid using a specimen transfer holder (two holders are provided - for TEM grids and for SEM stubs). The K775X has controls for time and temperature and at the end of the drying period the stage may be heated prior to specimen removal.

Ten-segment sequence

A microprocessor-controlled 10-segment sequence allows 10 time periods and 10 temperature settings to be programmed to achieve a range of drying protocols. Up to 10 different protocols can be stored for future use. The system also has facilities for purging with nitrogen gas.

Additional Information

Requirements

The K775X requires a 50L/m rotary vacuum pump with oil mist filter (order separately) for rough pumping the chamber and to 'back' the turbomolecular pump.

Options and Accessories

- * EK4100 Auto 'top-up' system with 60L pressurised dewar
- * EK4180 Liquid Nitrogen Slushing Chamber with connections to system rotary pump

Specifications

Weight and dimensions	450mm W x 350mm D x 175mm H. Weight: 18kg
Work chamber	Borosilicate glass 165m Ø x 125mm H
Safety shield	Polycarbonate cylinder
Timer	0-999 hours
Specimen stage	140°C to +40°C. Initial cool down to -140°C in approximately 45 minutes - final temperature can be lower
Temperature controller and monitor	-90°C to +90°C, display resolution to 0.1°C
Vacuum range	1x10 ⁻² mbar to 1 x 10 ⁻⁵ mbar
Vacuum	60L/s built-in air cooled turbomolecular pump
'Backing' rotary pump	50L/m or greater (see EK3175). Range: to 10 ⁻² mbar (order separately)
Electrical supply	230V/50Hz (6A max including pump), 115V/60Hz (12A max including pump)
Supplied with	Vacuum hose and connectors, moisture trap and operating manual

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Ordering Information

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K775X (EK3147) Liquid Nitrogen Cooled, Turbo-Pumped Freeze Dryer

Pumping NB: A 50L/m rotary pump is needed to 'back' the turbo pump

EK3175 Rotary pump - Edwards RV3 - 50L/m with oil mist filter

Options

EK4100 Auto 'top-up' system with 60L pressurised dewar

EK4180 Stand-alone liquid nitrogen slushing chamber (requires
additional rotary pump, eg EK3175)

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