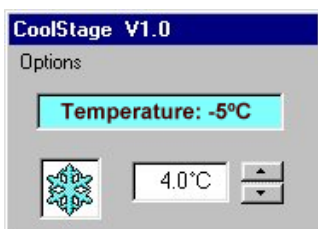
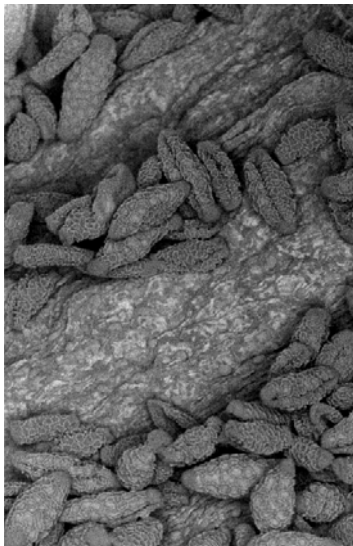


With increased use of low vacuum or variable pressure SEMs many microscopists have expressed the need for a simple temperature controlled specimen holder to control evaporation of water vapour from samples.



CoolStage is a temperature controlled specimen holder which may be fitted to any Low Vacuum or Variable Pressure SEM

The system comprises a thermally isolated specimen holder with a single stage Peltier device and dual temperature sensor, a vacuum feedthrough flange, water chiller, power supply box and keypad for digital temperature readout and control.



Temperature range is -25°C to $+50^{\circ}\text{C}$ at 300Pa.

The specimen holder is water cooled from a small self-contained closed loop chiller box located approximately 2m away from the SEM. The temperature of the specimen holder is monitored and controlled by a microprocessor.

A small keypad with bright VF display sets the required temperature and displays target and current temperatures. The specimen holder has been designed to minimise image drift due to temperature change, giving a stable image at high magnification.

An integrated RS-232 interface allows temperature to be set and read from the SEM.

SPECIFICATIONS & FEATURES

- available for any LEO, JEOL, Hitachi, Topcon, FEI SEM
- temperature range -25°C to $+50^{\circ}\text{C}$ at 300Pa with ambient at 20°C
- temperature accuracy $\pm 1.5^{\circ}\text{C}$
- temperature display resolution 0.1°C
- temperature stability $\pm 0.2^{\circ}\text{C}$
- maximum cooling/heating rate 8°C per minute
- keypad/display for temperature display and control
- simultaneous display of actual and target temperature
- vacuum feedthrough plate with all connections
- cooling plate height 7-20mm
- design optimised for minimal image drift
- microprocessor controlled
- RS-232 interface for remote readout and control

Why cool specimens in Low Vacuum?

With increased use of Low Vacuum or Variable Pressure microscopes, many microscopists now appreciate the need to control water evaporation from wet samples.

By cooling a wet specimen, water evaporation may be slowed or depending on chamber pressure stopped altogether.

As the chart below indicates, saturated vapour pressure of water decreases considerably with temperature. At room temperature water will very quickly evaporate causing considerable changes to the specimen structure.

At 300Pa, specimen temperature needs to be less than -9.5°C and at 85Pa specimen temperature needs to be less than -25°C to stop water evaporation. Therefore by cooling a specimen to -25°C, chamber pressure may be 85Pa with no water evaporation from the specimen.

Advantages of this procedure are clear to see, by cooling a specimen in low vacuum, changes in specimen structure due to water evaporation can be minimised and the ability to operate at higher vacuum provides a better signal to noise ratio and clearer images.

The Deben Coolstage is available for all Low Vacuum or Variable Pressure SEMs and guaranteed temperature range is +50°C to -25°C (at 300Pa).

Saturated vapour pressure of water as a function of temperature

