

# Hitachi TM-3000 Tabletop Microscope Accessories

A range of Deben accessories to enhance the capabilities of the Hitachi TM-3000 Tabletop Microscope.

## Tilt & Rotate Sub-Stage

- Continuous specimen rotation and tilt from  $-15^{\circ}$  to  $+60^{\circ}$

## Peltier Cooling Stage

- Enhanced charge reduction mode when observing wet samples

## Tensile Stage

- Real-time observation of specimens under stress loads

## XY Stage Automation

- Joystick control with  $1\mu\text{m}$  repositioning and remote control

## Rotation Stage

- Rotate cylindrical objects such as stents



# Hitachi TM-3000 Tabletop Microscope Accessories

By replacing the original stage door with the Deben accessory door any of the Deben accessories can be fitted to the TM-3000. The replacement door provides a convenient flange for mounting an accessory of your choice and all accessories can be installed and used at the same time as an EDX system.

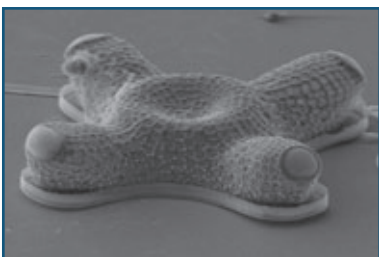
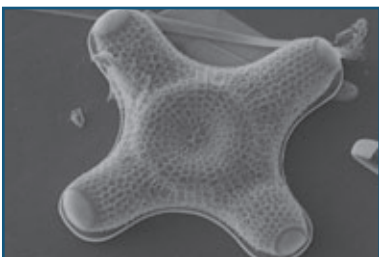
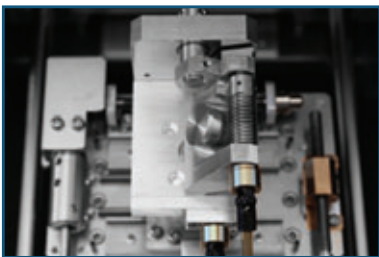
Following installation of the door by a trained technician, accessories may be installed or removed by the operator with ease. A blanking plate is provided for installation when no accessories are required. The accessory door does not affect normal microscope operation and can remain installed for the life of the microscope. All accessories, including the door, have been fully x-ray tested.



## Tilt & Rotate Sub-Stage

The tilt & rotate stage provides continuous specimen rotation and tilt from  $-15^{\circ}$  to  $+60^{\circ}$ .

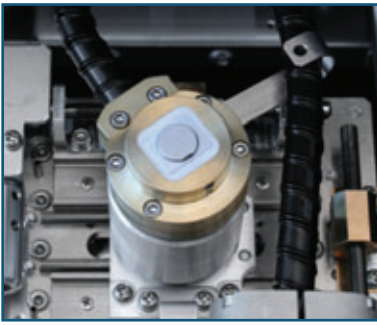
The tilt & rotate stage is supplied with an in-built chamber camera which gives a live TV image of the chamber interior to assist with positioning of the sample. Taking the perfect picture is now much easier because you can easily look around the side of specimens and align them correctly on the screen. The chamber camera can also be used independently to the tilt & rotate stage.



## Specifications

- Sub-stage, mounts to existing XY stage via Deben accessory door
- Rotation range: continuous
- Tilt range:  $-15^{\circ}$  to  $+60^{\circ}$
- Control system: manual controls
- In-built chamber camera with 5.6" TFT monitor
- Infra-red camera illumination (can not be used with beam on)
- Maximum sample size, 26mm x 9mm (diameter x height)



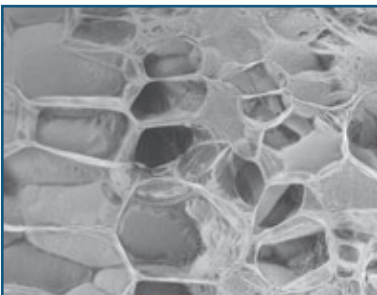


## Peltier Cooling Stage

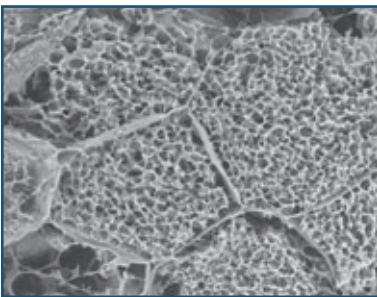
By operating the TM-3000 in charge reduction mode and cooling the specimen to  $-25^{\circ}\text{C}$  (optionally to  $-50^{\circ}\text{C}$ ), water evaporation can be substantially reduced. Advantages of this procedure include minimising changes in the specimen structure due to water evaporation and prolonging viewing time before specimen drying occurs.

The Coolstage system is fully self-contained and comprises a thermally isolated specimen holder with a single stage Peltier device, dual temperature sensors, vacuum feedthrough flange, self-contained water chiller and keypad for digital temperature readout and control.

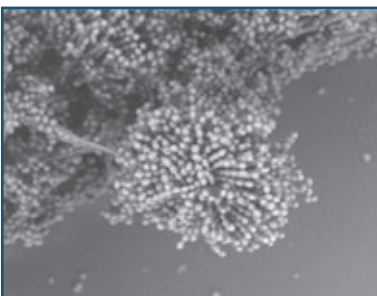
The specimen holder is water cooled and the temperature of the specimen is accurately monitored and controlled by a microprocessor. A small keypad, with bright display, allows the user to set the required temperature and displays current and target temperatures simultaneously.



• Cross section of cucumber at  $-30^{\circ}\text{C}$



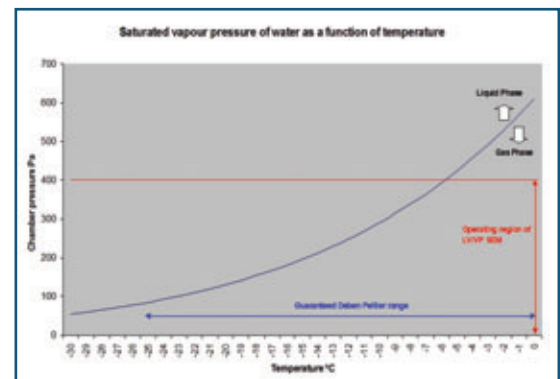
• Cross section of chilli at  $-30^{\circ}\text{C}$



• Mould on hard cheese at  $-30^{\circ}\text{C}$

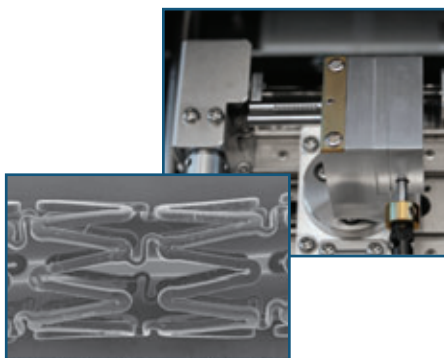
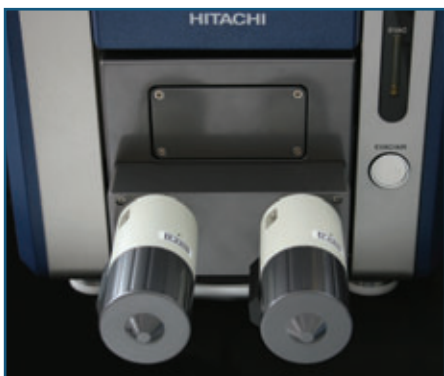
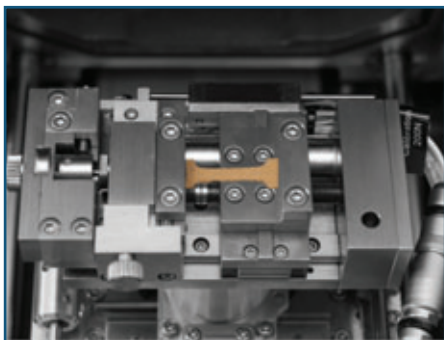
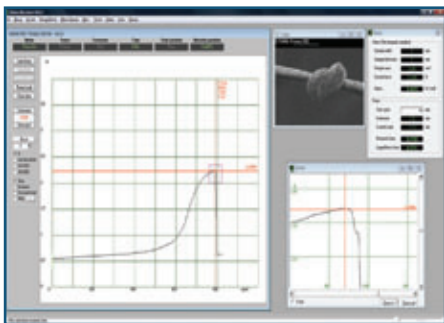
### Applications:

- Extend viewing times of wet specimens
- Retain water in biological (plant/animal) samples
- Reduce beam damage to sensitive specimens



### Specifications:

- Sub-stage, mounts to existing Hitachi XY stage via Deben accessory door
- Temperature range  $-25^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at 50Pa with no external cooling water from SEM. At high vacuum lowest temperature will be around  $-35^{\circ}\text{C}$  with room temperature at  $20^{\circ}\text{C}$
- Temperature accuracy  $\pm 1.5^{\circ}\text{C}$
- Temperature display resolution  $0.1^{\circ}\text{C}$ , temperature stability  $\pm 0.2^{\circ}\text{C}$
- Maximum cooling/heating rate  $12^{\circ}\text{C}$  per minute
- Control keypad with simultaneous display of actual and target temperature
- Optionally available with temperature range  $-50^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at 50Pa



## Tensile Stage

The tensile stage allows dynamic tensile or compression testing to be carried out inside the SEM chamber. Loadcells in the range 2N to 200N are available giving resolutions to 1mN. Samples are mounted horizontally, clamped with a pair of jaws and supported on precision sliding bearings. A dual threaded leadscrew drives the jaws symmetrically in opposite directions keeping the sample centred in the field of view.

Deben Microtest software controls the stage by USB from the SEM computer and displays live data curves within the software. 3&4 point bending clamps, fibre clamps and peltier heating/cooling are optionally available.

### Applications

- Suitable for testing thin-films, foodstuffs, textiles, polymers and fibres
- Observe dynamic changes to specimens while under stress load

### Specifications

- Sub-stage, mounts to existing XY stage via Deben accessory door
- Tensile and compression testing
- 200N loadcell with 20N and 2N options
- Speed range from 0.1mm/min to 1.5mm/min
- Travel, 10-20mm or 25-35mm
- Resolution 1000:1 dynamic, 2000:1 static (of full scale force)
- Accuracy, +/-1% of full scale force

## XY Stage Automation

Deben Sprite XY stage automation provides joystick control of the SEM stage with repositioning accuracy to 1 $\mu$ m. Control is from the proven Sprite stage controller using compact high precision stepper motors and a joystick controller with coordinate storage.

### Applications

- Reduce risk of repetitive strain injury
- Automated EDX and image analysis
- Easily recall points of interest

### Specifications

- High resolution stepper motor control with 10nm step size
- Analogue joystick with variable speed control
- Keypad controller with bright coordinate display
- 99 position memory store
- +/-1 $\mu$ m repositioning accuracy
- Remote control by USB or RS-232

## Rotation Stage

A manual rotation stage for easy high magnification observation of uniform cylindrical objects such as springs, stents, needles etc. The stage can be easily mounted and control is from either the tilt & rotate feedthrough or a custom feedthrough with just one control knob. Rotating a stent in the SEM allows full observation of the inner and outer surface of the stent with a large depth of field at high magnification, something which is difficult with an optical observation system. Spacer blocks are supplied to allow observation of cylindrical objects from 1mm to 20mm diameter.