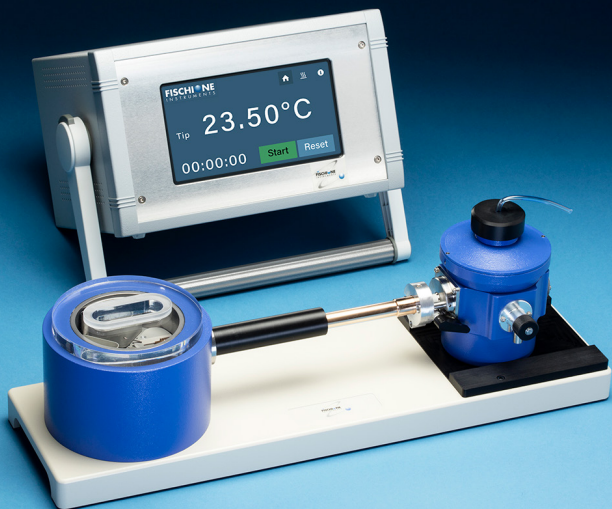


Cryo Cartridge Specimen Holder

Cryo transfer and screening of
thin-film frozen-hydrated/vitrified
specimens mounted in sample
grid cartridges



MODEL 2552

Cryo Cartridge Specimen Holder

Cryo transfer and screening of thin-film frozen-hydrated/vitrified specimens mounted in sample grid cartridges

- For specimens contained in cartridges that require liquid nitrogen cooling for transfer to a transmission electron microscope (TEM) for cryo-electron microscopy (cryo-EM)
- Allows for specimen prescreening in a standard TEM to determine specimen quality, which maximizes throughput and data collection in advanced TEMs with automated loading systems
- Base temperature less than -175 °C
- Preserves the specimen's vitreous state during transfer
- Advanced mechanism for frost-free transfer
- Integrated clamp for tool-free specimen mounting
- Resolution better than 0.20 nm
- Low drift rate of 1.5 nm/min

CRYO-ELECTRON TOMOGRAPHY

Cryo-electron tomography is a well known technique used for the evaluation of biological specimens. Structural details are imaged in a transmission electron microscope at cryogenic temperatures to reveal information from specimens such as proteins and viruses.

Prescreen specimen quality to maximize cryo-EM throughput

Understanding specimen quality is a critical aspect of cryo-EM. Due to inconsistencies in sample preparation methods, specimens can often be crystalline, which prevents meaningful data collection.

In advanced TEMs, multiple specimens are loaded and then individually imaged and analyzed, often in an unattended mode. When the quality of the specimen is less than ideal, valuable time is wasted generating meaningless data.

The Model 2552 Cryo Cartridge Specimen Holder is an advanced single-tilt holder that enables the use of a standard TEM to assess specimen quality. Specimens of sufficient quality can then be loaded into an advanced TEM for data collection.

A key characteristic of the Cryo Cartridge Specimen Holder is that it maintains cryogenic temperatures during “reverse transfer.” That is, after the specimen has been imaged in the TEM, the specimen is maintained at cryo temperature during the return to the cryo workstation for subsequent loading into the specimen grid cartridge.

The holder includes a Model 9010 Vacuum Storage Container, an anti-boiling tool, a specimen loading tool, and Viton tubing for

connection to a pumping station. The cryo workstation and the temperature controller are purchased separately.

Simple specimen loading and transfer

The innovative design of the specimen tip makes loading and unloading of the grid containing the cartridge very easy. To load a cartridge, the holder is inserted into the cryo workstation to cool down. The holder dewar and the cryo workstation are both filled with liquid nitrogen.

The modular design of the cryo workstation allows the reservoirs to be repositioned to enhance ease-of-use for both right- and left-handed operation.

Once a temperature of less than -175°C is achieved, a cartridge is loaded from the grid box into the holder tip. The holder accepts a 3.5 mm diameter cartridge, which is secured by the holder’s one-piece, integrated clamp.

The clamp automatically closes when the holder tip is retracted. Optionally, the clamp can be closed with forceps or with the supplied tool. The thin profile of the clamp maximizes specimen visibility.

The specimen holder tip retracts inside an actively cooled cryo shield located within the holder. This



CRYO WORKSTATION

The modular reservoirs in the cryo workstation can be repositioned to accommodate left- or right-hand use.

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shield prevents condensation from forming on the specimen during transfer to and from the microscope. The vitrified state of the specimen is maintained after transfer from the microscope to the workstation for subsequent imaging in cryo-EMs with automatic loading systems.

Rapid cool down, extended hold time

The Cryo Cartridge Specimen Holder rapidly reaches a working temperature of less than -175 °C in either the cryo workstation or a TEM. Hold times in excess of 4 hours are readily obtained with the 200 ml dewar capacity. A zeolite absorption medium enhances dewar vacuum. The temperature controller connects directly to the specimen holder dewar and displays the holder tip temperature.

Regenerating the zeolite

The dewar zeolite must be regenerated periodically. This process is made easy with

the one-touch Zeolite Regeneration button on the temperature controller. Fischione Instruments recommends the Model 9030 Turbo Pumping Station to evacuate the dewar during regeneration.

Plasma cleaning

Prior to freezing thin films, TEM carbon support grids should be cleaned to remove hydrocarbons and to make the grids' surface hydrophilic. Fischione Instruments recommends that you clean the support grids with the Model 1020 Plasma Cleaner or Model 1070 NanoClean.

Collision protection

Fischione Instruments' advanced specimen holders are compatible with the TEM's touch alarm that stops goniometer movement if a pole touch occurs. Follow the microscope manufacturer's recommendation for operating the goniometer at high-tilt angles.



E.A. Fischione Instruments, Inc.
9003 Corporate Circle
Export, PA 15632 USA
Tel: +1 724.325.5444
Fax: +1 724.325.5443
info@fischione.com
www.fischione.com

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