

Multi-Specimen Single Tilt Cryo-Transfer Holder

Model 910

Multi-specimen cryo-transfer holder, model 910, is designed for low temperature screening and preliminary assessment of radiation-sensitive, frozen hydrated specimens for cryo-electron microscopy (cryo-EM).¹ The multi-specimen capability of the 910 holder allows more than one specimen condition to be judged with only one cryo-transfer into the transmission electron microscope (TEM), thus minimizing the number of cryo-transfers and preserving the high vacuum environment within the TEM.

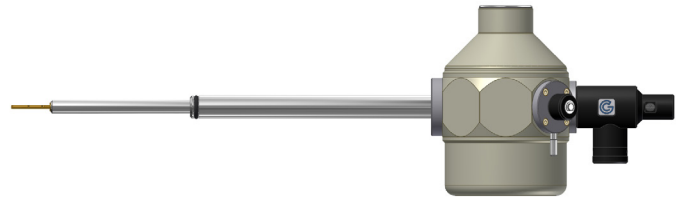
Depending on the make and model of the TEM, either two or three frozen hydrated specimens can be loaded into the model 910 holder's multi-specimen carrier and subsequently transferred into the TEM at one time to allow simultaneous viewing or comparative imaging. The multi-specimen carrier is manually positioned using the specimen selector control that is mounted on the specimen holder. A positive 'click-stop' ensures that each specimen is properly positioned along the viewing axis of the TEM. A number on the specimen selector identifies the specimen grid that is currently being viewed.

A Splitring™ specimen clamping device enables specimens to be quickly loaded and secured into the pre-cooled multi-specimen carrier. The Splitring device is a tapered metal ring that has a slot through one side and a circular groove around its inside diameter to accommodate an insulated insertion tool. The taper on the Splitring device squeezes against a matching taper in the cartridge recess to create a gentle downward force that secures the specimen grid, providing excellent thermal contact between the specimen grid and the carrier.

A cryo-workstation provides a protected environment for loading the frozen-hydrated specimens. A stationary, one piece cryo-shield protects the frozen hydrated grids against damage caused by warming and frost formation during transfers from the cryo-workstation to the TEM. The entire tip of the model 910 holder is cooled to the minimum operating temperature during use, ensuring stable specimen temperature and low drift performance.

Benefits

- **Multiple specimen capability:** Specimen carrier holds up to 3 grids



- **High throughput screening of frozen hydrated specimens:** Minimizes the number of cold transfers into the TEM while determining the best freezing conditions for the specimens
- **Frost-free specimen transfer:** Light weight cryo-workstation provides low temperature specimen loading to protect the frozen hydrated grids. A stationary one piece cryo-shield protects the frozen hydrated grids providing protection against damage caused by warming and frost formation during transfer from the workstation to the electron microscope
- **Precise temperature measurement:** Temperature of the holder is monitored by a calibrated silicon diode that provides a sensitive, linear temperature response. The conductor rod connecting the specimen holder tip to the liquid nitrogen dewar contains an electric heater to change the specimen temperature
- **Splitring specimen securing mechanism:** Maintains excellent thermal contact between the specimen carrier and the frozen hydrated specimen grid

¹ Tilt ranges and compatibility of specimen holders vary according to the TEM manufacturer, model, pole piece gap, and the presence of in-gap accessories.

Applications

Radiation-sensitive specimens including:

- Dispersed biological macromolecular assemblies
- 2D crystals
- Nano-particles
- Colloids

Multi-Specimen Single Tilt Cryo-Transfer Holder, Model 910

Specifications

Drift rate at 0° tilt (nm/min)	1.5
Resolution at 0° tilt (nm)	0.34
Observable area at 0° tilt (mm ²)	4.10
Diameter (mm)	2.3
Observable area at 60° α -tilt ¹ (mm ²)	0.69
Specimen carrier material	Beryllium copper
Capacity	
Number of grids	2 or 3
Diameter (mm)	3
Max. grid thickness (μ m)	100
Cryogen	Liquid nitrogen
Min. operating temperature (°C)	Less than -170
Time to reach min. operating temperature (min)	~30
Dewar capacity (mL)	175
Hold time at min. operating temperature (h)	3.5 – 4

Specifications provided herein are approximate and are intended only as guidelines. Drift rate and high resolution performance are dependent upon ambient conditions and installation of the TEM pursuant to the manufacturer's specifications. Specifications are subject to change.

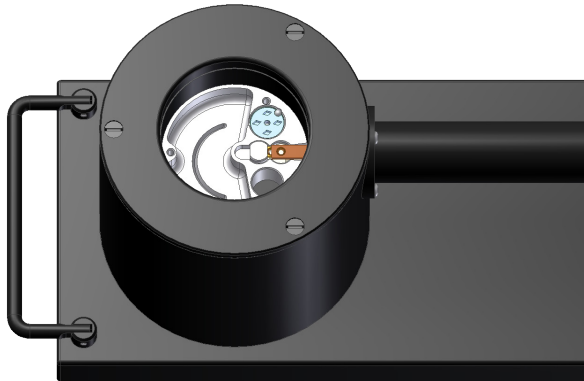


Figure 1. Workstation with model 910 holder inserted.

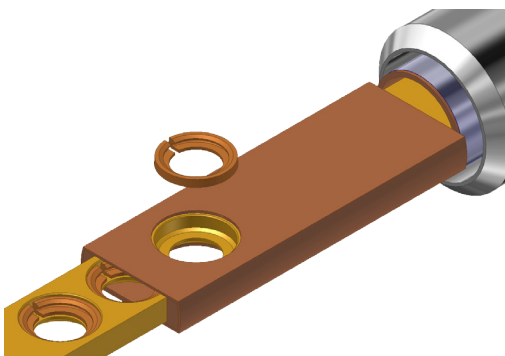


Figure 2. Tip of model 910 holder showing Splitring specimen securing mechanism.

Ordering

Model	Description
910	Multi-specimen cryo-transfer single tilt holder with workstation and tools

Other products to consider

- Solarus[®] advanced plasma cleaning system
- Cryoplunge[™] 3 system
- Turbo pumping station
- TAC100 series liquid nitrogen anti-contaminator
- Gatan Microscopy Suite[®] software

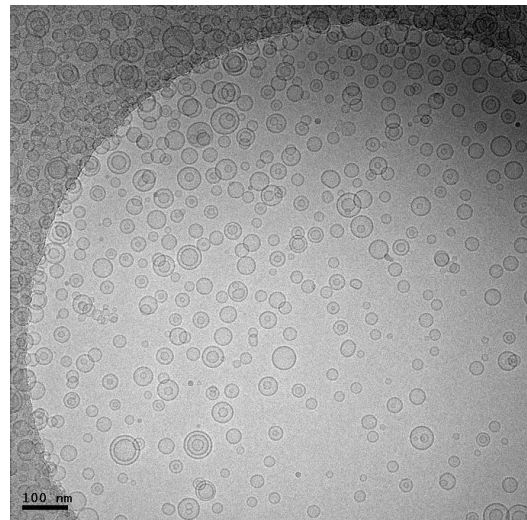


Figure 3. Frozen hydrated lipid vesicles prepared using Cryoplunge 3 and Solarus systems. Image was recorded at TEM magnification of 25kx at 200 keV and electron dose of ~ 20 e⁻/Å² using model 910 multi-specimen single tilt cryo-transfer holder and an UltraScan[®] 4000 camera. Sample was prepared on Quantifoil[®] specimen support, using model 950 Solarus advanced plasma cleaning system prior to freezing. Image courtesy of Ms. Jessica Goodwin and Mr. Htet Khant, National Center for Macromolecular Imaging, Baylor College of Medicine, Houston, TX, USA.

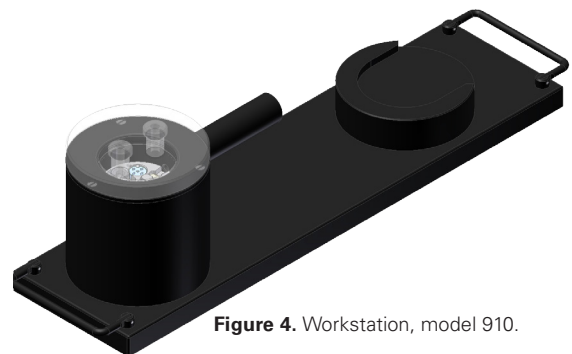


Figure 4. Workstation, model 910.