

MODEL 2021

## Analytical Tomography Holder

Optimizes the acquisition of elemental  
composition and structural information in  
three dimensions





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## Analytical Tomography Holder

A revolutionary holder that allows room temperature data collection of elemental composition and structural information over wide tilt and translation ranges, even in restrictive pole-piece-gap geometries.

### TOMOGRAPHY FOR LIFE AND PHYSICAL SCIENCES

Advances in characterization techniques require the ability to analyze structure and elemental composition in three dimensions. However, most transmission electron microscopy (TEM) techniques are limited to producing two-dimensional information. Tomography, on the other hand, combines two-dimensional data sets that are taken at various tilt angles to produce three-dimensional information.

Biological research has benefited from the use of electron tomography for many years; however, the physical sciences have been limited by the inability to tilt the specimen to high angles within the confines of the narrow-gap pole pieces.

Fischione's advanced specimen holder technology enables tomography at high tilt angles in narrow-gap pole pieces for both the life and the physical sciences.

With advancements in energy dispersive X-ray spectroscopy and innovations in TEM specimen holder technology, three-dimensional elemental composition information is readily achieved.

- **Optimized for energy-dispersive X-ray spectroscopy**
- **Beryllium tip and clamps reduce the addition of spurious or system radiation**
- **High tilt angles**
- **Large field of view**
- **Easy, accurate specimen loading and orientation**

## Optimized for EDS

The Model 2021 Analytical Tomography Holder for TEM is optimized for energy dispersive X-ray spectroscopy (EDS). The holder tip and clamps are manufactured from beryllium, which has a low atomic number and thereby reduces X-ray production by the holder.

While the holder is optimized for EDS, it is also ideal for any application that requires high specimen tilt angles.

## Tilt angles up to $\pm 80^\circ$

The Analytical Tomography Holder enables the imaging of specimens at extremely high tilt angles – up to  $\pm 80^\circ$ . The holder offers a large field of view, up to 1.6 mm at  $70^\circ$ , in pole-piece gaps of approximately 5 mm or greater.

The holder resolution is 0.34 nm (in all directions) and drift is  $< 1.5$  nm/minute.\*

## Unique clamp design eliminates shadowing

The holder's streamlined specimen clamping mechanism eliminates the shadowing associated with most holders at high tilt angles.

Specimens are secured with two beryllium clamps that produce an evenly distributed force on opposing edges of the specimen. The clamps are spring-loaded to lift them off the specimen surface during loading and unloading,

Positioning the clamps is done without contacting the specimen, eliminating the possibility of specimen damage or rotation during clamping. This is far superior to typical clamping mechanisms that limit the specimen size or interfere with viewing at high tilt angles.

The tapered, self-centering specimen cup guides the specimen into position. The fully retractable clamps make it easy to prealign or rotate the specimen manually for a dual-axis tilt series.

The Analytical Tomography Holder's clamping mechanism accepts specimen grids, standard 3 mm diameter TEM specimens, or focused ion beam (FIB) lamella. The holder accommodates specimen thicknesses up to 250  $\mu\text{m}$ .

## Touch protection

Fischione's advanced tomography holders are compatible with the TEM's touch alarm, which stops goniometer movement in the event that a pole touch occurs. Always be aware of the TEM's pole-piece configuration and follow the microscope manufacturer's recommendation for operating the goniometer at high tilt angles.

## PLASMA CLEANING

Fischione recommends that you clean the specimen and specimen holder with the Fischione Model 1020 Plasma Cleaner or Model 1070 NanoClean before insertion into the TEM.

During collection of tomographic data, the electron beam will be on the same area of the specimen for an extended time. As a result, organic contamination may build up on the specimen.

A plasma cleaning time of 10 seconds to 2 minutes removes the contamination. Longer cleaning times can remove contamination spots caused by previous TEM viewing of non-plasma cleaned specimens.

When not in use, the holders should be stored under vacuum in Fischione Model 9010 Vacuum Storage Containers or the Model 9020 Vacuum Pumping Station.

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The Model 9010 Vacuum Storage Container

### Ordering information

All Fischione tomography holders come with a dedicated loading station to facilitate specimen handling, tools to assist in specimen clamping, and a Fischione Model 9010 Vacuum Storage Container for storing the holder in a clean, vacuum environment.

\*All specifications depend on the microscope model, pole-piece type, and aperture position. For ultimate resolution and drift performance, the TEM must meet the manufacturer's specifications.

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