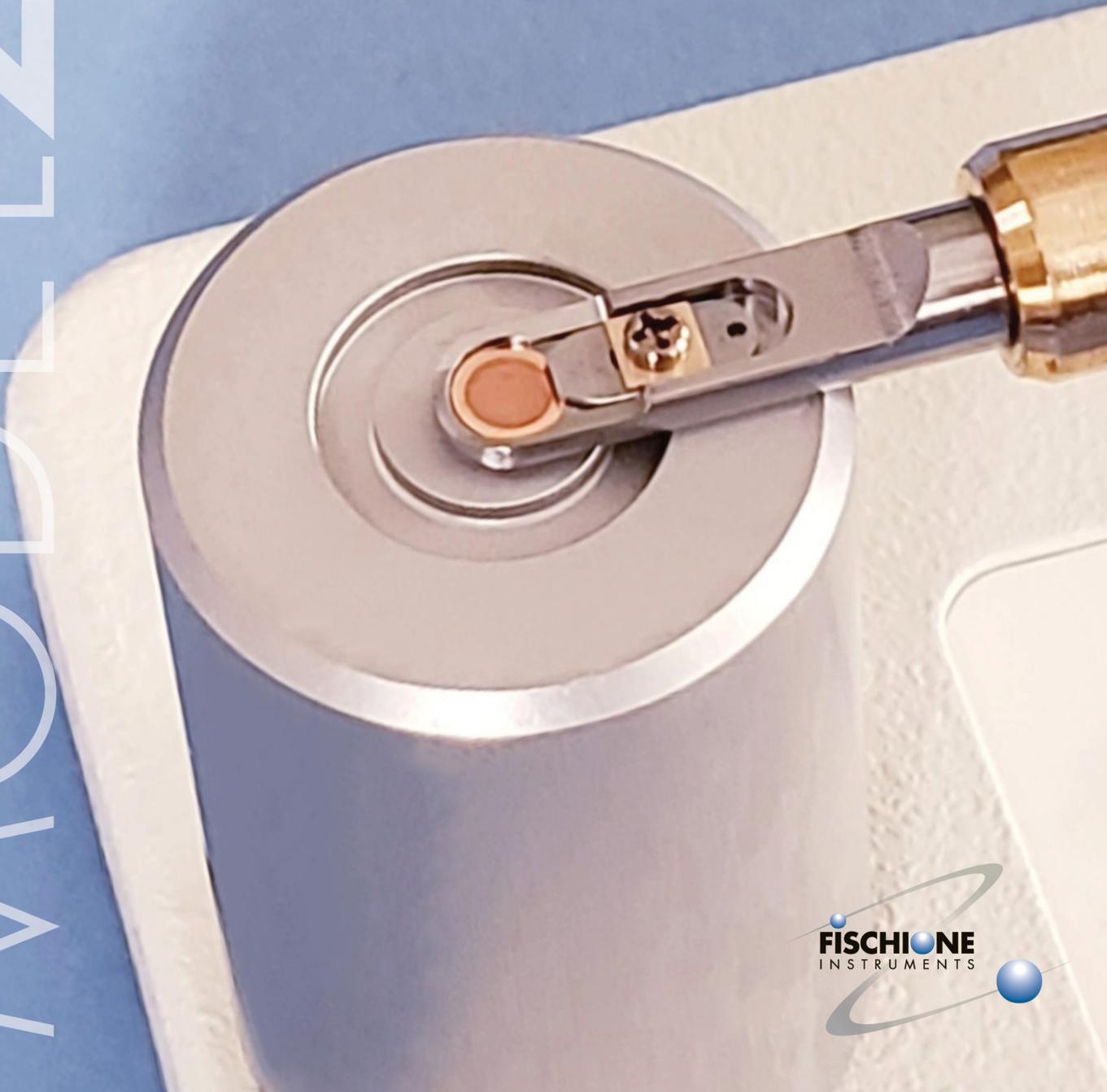


MODEL 2023

## Compact Analytical Tomography Holder

Optimizes the acquisition of elemental composition and structural information in three dimensions; minimal holder volume and materials selection for enhanced X-ray performance





## 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 Instruments' 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.

# MODEL 2023

## Compact 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. The compact design results in minimal holder volume for enhanced X-ray performance.

- **Optimized for energy-dispersive X-ray spectroscopy**
- **Beryllium tip and clamp 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 2023 Compact Analytical Tomography Holder for TEM is optimized for energy dispersive X-ray spectroscopy (EDS). The holder tip and clamp 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. The compact design yields minimal holder volume. Combined with the beryllium tip and clamp, the holder provides enhanced X-ray performance.

## Tilt angles up to $\pm 65^\circ$

The Compact Analytical Tomography Holder enables the imaging of specimens at high tilt angles – up to  $\pm 65^\circ$ . The holder offers a large field of view, up to 1.4 mm at  $\pm 65^\circ$ , in pole-piece gaps of approximately 5 mm or greater. The holder resolution is 0.34 nm [3.4 Å] in all directions and drift is  $< 1.5$  nm/minute.†

## 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 one beryllium clamp that is spring-loaded to lift it off the specimen surface during loading and unloading,

Positioning the clamp is accomplished without contacting the specimen, which eliminates 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 clamp makes it easy to prealign or rotate the specimen manually for a dual-axis tilt series.

The Compact 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 Instruments'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

## PLASMA CLEANING

Specimen holders and TEM specimens may acquire organic contamination:

- prior to insertion into the microscope, or
- during the collection of a tomography data set (caused by the beam dwelling on the same area of the specimen for an extended period of time).

Fischione Instruments recommends the Model 1020 Plasma Cleaner or the Model 1070 NanoClean for plasma cleaning the holder and (nonoxidation-sensitive) specimens prior to insertion into the microscope. If the specimen is not compatible with oxygen-containing (or oxygen-bearing) plasmas, clean the holder only.

Contact your Fischione Instruments representative for more information on the Model 1020 Plasma Cleaner and the Model 1070 NanoClean.

## MODEL 2023 Compact Analytical Tomography Holder



Model 9010 Vacuum Storage Container

the microscope manufacturer's recommendations for operating the goniometer at high tilt angles.

### Ordering information

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

†See the product's instruction manual for safety information regarding working with and disposing of instruments with beryllium components.

\*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.



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](mailto:info@fischione.com)  
[www.fischione.com](http://www.fischione.com)

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