

Tecnai G² Polara

The Ultimate Tool for Advanced Structural Biology

Within the last decade we have witnessed a revolution in our understanding of the processes responsible for the maintenance, transmission and expression of genetic information at the molecular level. Whereas DNA stores the information for protein synthesis and RNA carries out the instructions encoded in DNA, proteins carry out most biological activities. Their synthesis, structure and function are at the heart of cellular functions. To truly understand a protein's function, scientists must first of all discern its intra- and intercellular behavior and interactions with cell organelles or pathogens and secondly determine its shape and three-dimensional structure down to the atomic level.

To address these challenges, cell and structural biologists need top quality results; results that can only be generated by top quality tools. It is FEI's mission to help you better understand the three-dimensional structures of cells, cell organelles and proteins. At the core of FEI's proven and comprehensive suite of solutions is our powerful range of dedicated Tecnai™ G² microscopes, tools designed specifically to meet the stringent demands of today's Life Science laboratories.

The Tecnai G² Polara is the culmination of more than 25 years of vacuum technology development and electron optical techniques that are required for Structural Biology investigations. The Windows 2000 operating system, the advanced TEM Imaging features in combination with the embedding of all peripherals make the Tecnai G² Polara an easy to use instrument. Tecnai G² Polara addresses all advanced user requirements while allowing setup of the system according to the preferences and access levels of individual users. The flexibility incorporated into the design of this system and its unsurpassed cryo-performance make the Tecnai G² Polara exceptionally suited for high-resolution investigations in Structural Biology research.

Understanding decreasing dimensions

- *A cartridge loading system that allows up to six frozen hydrated specimens to be investigated in any order and repeatedly over the course of the work day*
- *An ultra-high vacuum and ultra-clean specimen environment for virtually contamination-free specimen observation*
- *A stable low-drift, helium cooled specimen holder in a precision, high-tilt ($\pm 70^\circ$) eucentric stage for extensive recording of multiple specimen orientations (as in two-dimensional electron crystallography and high resolution cellular tomography)*
- *Special functions for low-dose imaging conditions and a cooled slow-scan CCD camera for low-dose digital image recording*
- *Fully embedded detectors, cameras and specimen stage all operating under one user interface to allow rapid and automated acquisition of large amounts of data.*

Essential specs

Objective lens	TWIN
Point resolution (nm)	0.236
Information limit (nm)	
• at high magnification	≤ 0.16
• at 59 k - 0° tilt	≤ 0.2
- 45° tilt	≤ 0.23
- 70° tilt	≤ 0.34
Cs objective (mm)	2.0
Cc objective (mm)	2.2
Focal length (mm)	2.7
Maximum eucentric tilt	± 70°

Electron Source

- Schottky Field emitter
- Very high spatial coherence due to high brightness
- Very high temporal coherence due to small energy spread (0.8 eV or less)
- High stability and long life

Illumination system

- Five lenses
- User-selectable intensity limit for specimen protection
- User-selectable zoom for constant screen intensity
- Low Dose for specimen protection

Imaging

- Patented TWIN objective
- High tilt (70°) and large field of view
- Rotation-free magnification
- Magnification reproducible within 1.5%
- Embedded CCD camera
- Plate camera with 56 sheets of film

Specimen stage

- Fully computer-controlled, eucentric side-entry, high-stability CompuStage
- Maximized tilts for any X,Y, Z, α combination
- Choice of 6 different specimen holders (6 storage positions for cartridges)
- X, Y movement 2 mm, specimen size 3 mm
- Specimen recall reproducibility ≤ 0.5 μ m (x, y) and ≤ 0.5° (α tilt) attainable
- Drift at:
 - 0° tilt < 0.5 nm/min
 - 45° tilt < 1.5 nm/min
 - 70° tilt < 2.5 nm/min
- Image displacement < 2.0 μ m during ± 70° tilt (for automated tomography)

Helium system

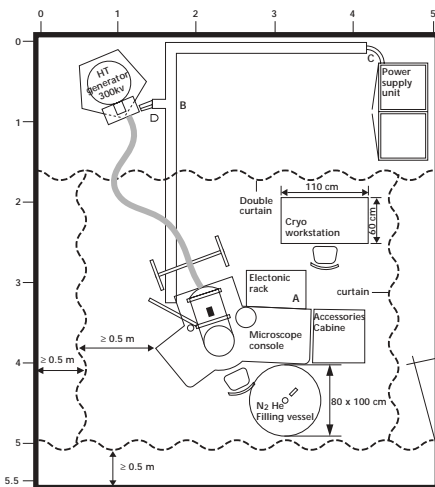
- Minimum cartridge temperature < 15 K
- Hold time of liquid helium reservoir > 6 hr
- Airlock cycle time (vacuum transfer of 6 cartridges) after preparation in Cryo workstation < 15 min
- Insertion time of specimen (cartridge) into the column < 2 min
- Setting time to low temperature once inserted into the column < 10 min

Vacuum

- Fully interlocked differentially pumped column.
- Oil-free vacuum system with turbo molecular pump, pre-pumping column, gun and specimen airlock
- Liner tubes pumped by additional ion getter pump
- Ultra-high vacuum for contamination free observation
- Vacuum levels: specimen chamber 10⁻⁵ Pa; gun 10⁻⁶ Pa
- Plate camera exchange without switching off High Tension and emitter

Operation / automation

- Operating system: Industry standard *Windows*® 2000.
- Remote Operation available
- Motorized apertures available
- Scripting software module available
- 2nd Data Monitor available



Minimal floorplan

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