

Tecnai Spirit TEM

The Tecnai™ Spirit TEM is an easy to use 20 kV to 120 kV transmission electron microscope (TEM) designed to provide high-contrast, high-resolution imaging and analysis. Accelerating voltages ranging from 20 kV to 120 kV are ideal for light element biological matrices and provide the low voltage capability.

Sophisticated automation allows the user to concentrate on scientific challenges rather than the details of operating the instrument. A series of embedded side-mount and bottom-mount CCD cameras provide instant, high-quality results at the push of a button. Available three-dimensional imaging software (Xplore3D™) automatically collects tomographic tilt series and reconstructs detailed three-dimensional models.

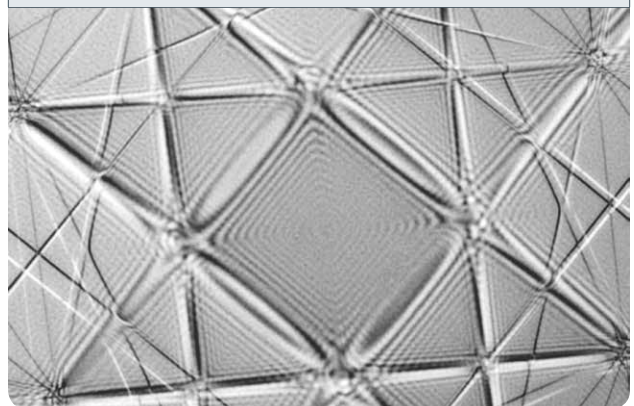
The high-performance vacuum system of the Tecnai Spirit TEM allows contamination-free imaging. Optional scanning mode (STEM) and energy dispersive X-ray analysis (EDX) permit elemental micro analysis with nanometer scale spatial resolution.

The Tecnai Spirit TEM is available in two lens configurations: the BioTWIN and the TWIN. The Tecnai Spirit BioTWIN TEM, specifically designed to maximize contrast in images of inherently low-contrast is well suited for exploring the 2D and 3D structures. The Tecnai Spirit TWIN TEM is a general purpose, high-resolution configuration, designed for structural, chemical composition analysis of all materials.

With its fast, convenient embedded automation, the Tecnai Spirit TEM automatically performs many routine operating procedures. It can automatically tune, align, saturate, and condition the gun and illumination, focus the image, and minimize astigmatism. Automation lowers the productivity threshold for novice users and helps ensure repeatable, high-quality results.

KEY BENEFITS

Easy to use transmission electron microscope.
Complete solution for dual-axis tomography.
High level of automation.
Ergonomic design for operational comfort.
High contrast and high resolution for 20 kV to 120 kV operation.
Optimized for 2D and 3D imaging.
Sharp imaging of thick samples.
Smart tracking position system for sample navigation.
Outstanding analytical performance.
Customized protocols for diverse applications.
RAPID-enabled for remote service diagnostics.





Electron source

- W or LaB₆ emitter
- Auto-saturation
- Auto-conditioning
- LaB₆ lifetime > 1 year
- Filament change < 5 minutes
- High voltage range 20 kV to 120 kV, continuously variable
- High tension switching time < 1 minute

Illumination system

- Four lenses
- Illumination modes micro/nanoprobe

Imaging

- TEM information limit < 0.20 nm
- STEM magnification 150 – 3.1 Mx
- Automated contrast enhancement function
- Focus preset for focusing at eucentric position
- Rotation-free magnification and diffraction series
- Embedded CCD camera*
- Embedded EDX
- EDX detector resolution ≤ 135 eV
- No spurious/system peaks

CCD Camera

- Embedded control for all supported CCD cameras
- Automatic magnification calibration for double CCD cameras

Specimen stage

- Fully computer controlled, eucentric, side entry CompuStage
- Variety of specimen holders (cryo, multiple, rotation holders etc.)
- X, Y movement 2 mm, Z movement 0.75 mm, specimen size 3 mm
- Specimen position store and recall including optics setting, i.e., intensity, magnification, spotsizes
- Minimum movement increments 0.5 μm (x, y) and 0.5° (tilt)
- Drift < 1 nm/min with standard holder
- Specimen exchange pumping time < 30 seconds
- Specimen exchange time without switching off high tension and emitter < 30 seconds
- STPS Smart Tracking Position System tracking interface for visualization of searching pathway including stored positions

Vacuum

- Fully interlocked, differentially pumped column
- Ultra-high vacuum for contamination free observation of the specimen
- Plate camera exchange without switching off high tension and emitter
- Column vacuum 1 x 10⁻⁵ Pa

Xplore 3D: 3D imaging software

- Complete solution for dual-axis tomography
- Fully automatic tilt series acquisition
- 3D reconstruction
- Single and dual-axis reconstruction
- Volume rendering, segmentation, and visualization

Operation/automation

- Operating system: Windows® XP
- User defined interface, three levels
- Remote operation software*
- Scripting SW module*
- Upgradeable functionality by uploading current and future application software solutions
- AutoGun module, enables automated gun conditioning, saturation, alignments
- One button direct light
- AutoTune module, enables automatic focus and astigmatism correction
- Low dose software*

Training and support

- On-line help files: English, Japanese, Chinese
- Application instructions available
- Customer FEI Academy training Basic and Advanced Materials, Advanced Life Sciences, Advanced Cryo
- RAPID enabled for remote service diagnostics

* = optional

Essential specifications

INFORMATION LIMIT	BioTWIN	TWIN
TEM line resolution	0.34 nm	0.20 nm
TEM magnification	22 × - 340,000 ×	18 × - 650,000 ×
STEM resolution	5 nm	1.0 nm
Focal length	6.1 mm	2.8 mm
Minimum focal step	9.0 nm	3.0 nm
SA camera length	0.05 m - 8.9 m	0.02 m - 4.2 m
EDX solid angle	0.35 str.*	0.175 str.
Maximum eucentric tilt angle	± 80°	± 70°
Fixed cryo shields	standard (EDX compatible)	N/A
Cryo box	optional (not EDX compatible)	optional (not EDX compatible)

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