



Understanding decreasing dimensions

Tecnai™ G² 20

The benchmark for multi-tasking

The Tecnai G² 20 is a highly advanced, state-of-the-art transmission electron microscope with an unrivalled task-oriented user interface. Running under Windows® XP operating system, it offers high performance with versatility, high productivity with ease of use, and all in a personal environment. The accessories that may be fitted onto these systems – e.g. STEM, CCD cameras, EDX and EELS detectors, and energy filters – are embedded into the user interface, allowing differently experienced operators to fully utilize the functionality of the total system through one coherent interface.

The Tecnai G² 20 is a reliable and versatile instrument which is ideally suited for studying a wide range of general and advanced materials, soft matter, composites, hybrids, tissues and cellular compounds. The flexibility to change the high tension to any other value in a minute helps to operate the Tecnai G² 20 always at optimum experimental conditions. Typically two different accelerating voltages are aligned including the energy filter upon installation, more can be requested. Mode changes are trivial and an unlimited number of alignments can be stored user specifically making optimization and mode switching rapid and trivial. Interaction of the electron beam with the specimen under investigation generates a wide range of signals, all carrying different types of valuable information. Tecnai G² series has been especially designed to acquire and process these signals efficiently and effectively. The combination of high resolution 2D and 3D imaging at both ambient and cryogenic conditions, bright-field, dark-field STEM imaging, electron diffraction and detailed microanalysis, makes the Tecnai G² 20 a versatile tool for classical materials science as well as life science applications.

The Tecnai G² 20 can be supplied in a variety of custom configurations. A range of patented symmetric objective lenses are available, all with their unique performance focus to exactly meet the requirements and need for different applications: high resolution work (S-TWIN) or ultra high resolution (U-TWIN), for high tilt applications (tomography series attainable up to ± 75°) and for optimal probe coherence and analytical performance (X-TWIN). In addition, a wide variety of FEI software solutions are available for different applications, calibration, automation, scripting and remote control.

- *High performance in S/TEM imaging and analysis*
- *High resolution versatile tool for material and life science applications*
- *Flexible high tension*
- *Simultaneous data recording by fully embedding STEM, CCD cameras, EDX detectors, EELS spectrometers and energy filters*
- *Ultra-clean vacuum for high resolution room temperature and cryo imaging*
- *Wide variety of optional FEI application software solutions, e.g. for automation (Autogun, AutoAdjust), magnification calibration and S/TEM tomography package*

Essential specifications

Electron source

- Flexible high tension (20, 40, 80, 120, 160, 200 kV and values in between)
- LaB₆ or W emitter

Imaging

- High tilt and large field of view ($\pm 70^\circ$ tilt for TWIN and double-tilt holder)
- Coma-free alignment for high resolution objective lens centering
- Ranged, rotation-free magnification and diffraction series
- Magnification reproducible within $\pm 1.5\%$
- Embedded CCD and/or energy filter
- Plate camera with 56 sheets of film (optional)
- Lorentz lens for field free imaging for magnetic field visualization (optional)

Diffraction

- Wide range of diffraction techniques, from coherent illumination for selected area diffraction or micro-diffraction to highly convergent (large angle) beam diffraction
- Maximum diffraction angle up to $\pm 16^\circ$ (U-TWIN)
- Energy filtered diffraction down to low camera length (<200 mm): maximum visible diffraction angle ± 125 mrad

STEM

- Fully digital scan system
- Bright Field and Annular Dark Field mode

Microanalysis

- Excellent EDX in-hole performance
- Low system background in EDX
- Embedded EDX and EELS spectrum profiling and imaging

OBJECTIVE LENS TYPES

	TWIN	S-TWIN	X-TWIN	U-TWIN
TEM point resolution (nm)	0.27	0.24	0.25	0.19
TEM line resolution (nm)	0.144	0.144	0.144	0.144
Minimum focus step (nm)	2	1.8	1.8	0.35
TEM magnification range	25 x - 700 kx	25 x - 1,030 kx	22 x - 930 kx	25 x - 1,000 kx
Camera length (mm)	52 - 6,000	30 - 4,500	30 - 4,500	45 - 4,300
Maximum diffraction angle	$\pm 10^\circ$	$\pm 13^\circ$	$\pm 12^\circ$	$\pm 16^\circ$
STEM resolution (nm)	1.0	1.0	1.0	1.0
STEM magnification range	100 x - 5 Mx	100 x - 5 Mx	100 x - 5 Mx	100 x - 5 Mx
Maximum tilt angle with double-tilt holder	$\pm 70^\circ$	$\pm 40^\circ$	$\pm 30^\circ$	$\pm 20^\circ$
Maximum tilt angle with tomography holder	$\pm 80^\circ$	$\pm 80^\circ$	$\pm 80^\circ$	n/a
EDS solid angle (srad)	0.13	0.13	0.3	0.13

Specimen stage

- Fully computer-controlled, eucentric side-entry, high stability CompuStage
- Maximized tilts for any X,Y,Z, α and β coordinates
- Capable for accommodating a variety of specimen holders including low-background double-tilt holder
- X, Y movement ± 1 mm, Z movement ± 0.375 mm; specimen size 3 mm
- Specimen recall reproducibility: $\leq 0.3 \mu\text{m}$ (after movement of $300 \mu\text{m}$ in x and y) and ≤ 0.1 (α tilt)
- Drift ≤ 1 nm/minute with a standard holder

Vacuum

- Fully interlocked differentially pumped column
- Gun and column area pumped by separate Ion Getter Pumps
- Liner tubes pumped by additional Ion Getter Pump (optional)

- Ultra-high vacuum for contamination-free observation
- Vacuum levels of specimen chamber and electron gun $< 2.7 \times 10^{-5}$ Pa
- Fast airlock pumping times: user selectable down to < 1 min

Software and control

- Operations system: Windows[®] XP
- Remote operation (optional)
- Scripting software (optional)
- Application software for Low Dose imaging, for montage, grid scanning, for diffraction and crystallography, and for calibration (optional)
- Xplore3D[™]: FEI's intelligent tomography solution for TEM and STEM (optional)
- Software for ease-of-use and standardization: Automation eucentric height, focus, astigmatism correction and gun alignments (optional)

FEI Company

World Headquarters
and North American Sales
5350 NE Dawson Creek Drive
Hillsboro, OR 97124-5793 USA
Tel: +1 503 726 7500
Fax: +1 503 726 7509

European Sales
Tel: +31 40 23 56 110
Fax: +31 40 23 56 612

Asia-Pacific Sales
Tel: +65 6272 0050
Fax: +65 6272 0034

Japan Sales
Tel: +81 3 3740 0970
Fax: +81 3 3740 0975

Info: fei.com/sales
www.fei.com



TUV Certification for design, manufacture, installation and support of focused ion- and electron-beam microscopes for the NanoElectronics, NanoBiology, NanoResearch and Industry markets.