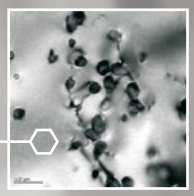
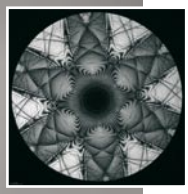
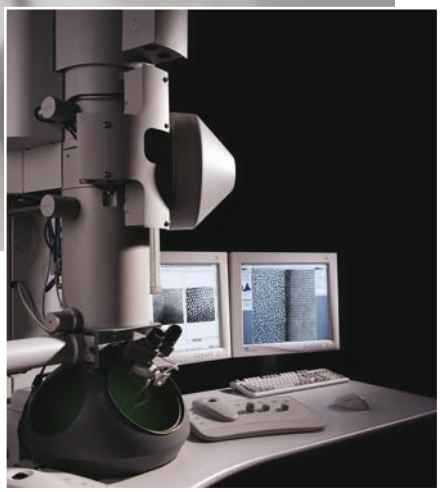
PRODUCT DATA

FEI COMPANY™
TOOLS FOR NANOTECH





Understanding decreasing dimensions



Tecnai™ G² 30

The benchmark for versatility and performance

The Tecnai G² 30 is a highly advanced, state-of-the-art 300 kV 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.

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

The 300 kV electron beam of the Tecnai G² 30 delivers higher resolution for a given objective lens geometry, a higher beam current and better sample penetration compared to a 200 kV TEM. The flexibility to change the high tension to any other value in a minute helps to work 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. The Tecnai G² 30 is equipped with a LaB_6 emitter and exhibits an information limit very close to the point resolution of its objective lens. Delocalization of image information is therefore minimized, and directly interpretable images are the result. In addition, a LaB_6 emitter generates a higher total beam current which is beneficial for low and medium magnification work and especially in combination with an energy filter for element specific imaging since acquisition times are shorter and signal to noise ratio is much better. The Tecnai G² 30 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), and for high tilt applications (tomography series attainable up to ± 75°). In addition, a wide variety of FEI software solutions are available for different applications, calibration, automation, scripting and remote control.

Essential specifications

	OBJECTIVE LENS TYPES		
	TWIN	S-TWIN	U-TWIN
TEM point resolution (nm)	0.24	0.20	0.17
TEM line resolution (nm)	0.144	0.144	0.144
Minimum focus step (nm)	2	1.8	0.5
TEM magnification range	58 x - 800 kx	60 x - 1,000 kx	60 x - 970 kx
Camera length (mm)	100 - 5,600	80 - 4,500	90 - 5,000
Maximum diffraction angle	±11°	±12°	±15°
STEM resolution (nm)	1.0	1.0	1.0
STEM magnification range	100 x - 5 Mx	100 x - 5 Mx	100 x - 5 Mx
Maximum tilt angle with double-tilt holder	±70°	±40°	±30°
Maximum tilt angle with tomography holder	±80°	±80°	n/a
EDS solid angle (srad)	0.13	0.13	0.13

Electron source

- Flexible high tension (50, 100, 150, 200, 250, 300 kV and values in between)
- LaB_6 or W emitter

Imaging

- High tilt and large field of view (± 70° 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 ± 1.5%
- Embedded CCD and/or energy filter
- Plate camera with 56 sheets of film
- 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 ± 15° (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

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: ≤ 0.3 µm (after movement of 300 µm in x and y) and ≤ 0.1 (α tilt)
- Drift ≤ 1nm/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
- Ultra-high vacuum for contamination-free observation
- Vacuum levels of specimen chamber and electron gun < 2.7×10^{-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)
- Xplore*3D*™: 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)

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

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