

Tecnai™ G² F20 Series

The versatile Nano-Analysis system

The Tecnai™ G² F20 series are reliable and proven (scanning) transmission electron microscopes, with a unique and unrivalled task-oriented user interface. The accessories that may be fitted to these systems have largely been embedded into this user interface, meaning that operators can utilize the full functionality of the total microscope system through one coherent interface, allowing all the capabilities of the system to be easily controlled by operators of different experience levels.

- *High performance in TEM imaging, STEM imaging and Nano-Analysis*
- *Ultra clean vacuum*
- *High spatial coherence due to an ultra-stable FEI Schottky source*
- *State-of-the-art, superior stability, high-tension circuitry results in an energy spread of less than 0.7 eV*
- *Computerized stage with unique eucentric specification for*
 - *the highest resolution tomography capabilities*
 - *maximized tilts*
 - *maximum stability*

The field emission Tecnai microscopes are a culmination of the best electron optical designs based on resolution performance, stability, specimen movement, as well as mode flexibility. The lens types that are available for the Tecnai G² F20 series allow you to choose the optimal combination of tilt/resolution and analytical performance required for your application (see Table 1).

The F20 series allow the high tension to be switched between 200 kV and any other value with one click of a mouse, and allow imaging with an aligned column/GIF in any mode (TEM or STEM) at any other pre-aligned chosen voltage. Typically in a standard installation, the TEM/GIF is aligned at two kV values. Upon request, additional alignments (at other voltages) can be carried out.

An unlimited number of user alignments (including field emission gun presets) can be stored on the microscope. This allows for rapid switching and optimization for different users.

The PC digitally controls all microscope functionality through a Tenserver service, which can be remotely accessed and which can be integrated with special service software for remote diagnosis. Mode changes of the microscope system are trivial, it is straightforward to go from a high resolution TEM image to a high resolution STEM image in seconds, and vice versa in the same time. Tecnai series microscopes have, in addition, a very large selection of application software developed by FEI, such as automated focus reconstruction (TrueImage™), automated tomography (Xplore3D™) as well as a Low-Dose package that sets the standard for imaging dose-sensitive samples. When fitted with a monochromator, energy resolutions down to 0.15 eV, previously only available on synchrotron sources, can be obtained routinely for fine Energy Loss spectroscopy work.

Essential specs

Electron Source

- Schottky Field emitter
- High maximum beam current (> 100 nA)
- High current in probe (0.5 nA or more in 1 nm probe)
- Small energy spread (0.7 eV or less)
- High stability and long life

Imaging

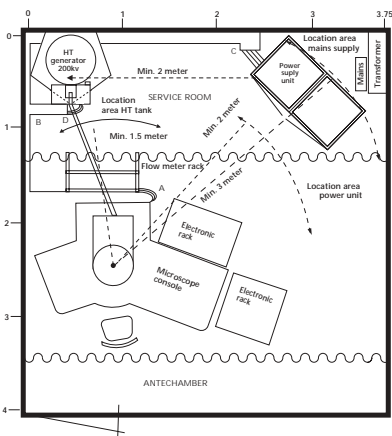
- Patented TWIN, S-TWIN, X-TWIN and U-TWIN objective lenses
- Unsurpassed information limit (0.12 nm achievable)
- Coma-free alignment for high-resolution objective lens centering
- Rotation-free magnification and diffraction series
- Magnification reproducible within 1.5%
- Embedded CCD/energy filter

STEM

- Bright Field and Annular Dark Field mode
- Ultra-high resolution STEM HAADF detector

Micro-analysis

- Excellent EDX in-hole performance (<1% hole count)
- Low system background in EDX (<1% spurious peaks)
- Embedding of EDX, PEELS and energy filter
- Spectrum imaging with multiple detectors



	OBJECTIVE LENS TYPES			
	TWIN	S-TWIN	X-TWIN	U-TWIN
TEM Point Res.	0.27 nm	0.24 nm	0.25 nm	0.19 nm
TEM Line Res.	0.144 nm	0.102 nm	0.102 nm	0.102 nm
Obj. Lens C_s	2.0 mm	1.2 mm	1.3 mm	0.5 mm
Obj. Lens C_c	2.0 mm	1.2 mm	1.3 mm	1.0 mm
Obj. Lens Focal Length	2.7 mm	1.7 mm	1.7 mm	2.2 mm
Information Limit	0.16 nm	0.14 nm	0.14 nm	0.12 nm
Extended Resolution (TruImage)	0.18 nm	0.16 nm	0.16 nm	0.14 nm
Minimum Focus step	3 nm	1.8 nm	1.8 nm	0.35 nm
Magnification range TEM	25x - 750kx	25x - 1030kx	22x - 930kx	25x - 1000kx
Probe C_s	2.0 mm	1.2 mm	1.0 mm	0.5 mm
Probe C_c	2.0 mm	1.2 mm	1.2 mm	1.0 mm
STEM HAADF Res.	0.24 nm	0.19 nm	0.18 nm	0.14 nm
Camera Length	50 mm - 7 m	30 mm - 4.5 m	30 mm - 4.5 m	45 mm - 4.3 m
Diffraction Angle	20°	26°	24°	32°
Magnification range STEM	150x - 230Mx	150x - 230Mx	150x - 230Mx	150x - 230Mx
EDS: Solid Angle	0.13 sr	0.13 sr	0.3 sr	0.13 sr
Tilt Angle (double-tilt holder)	70°	40°	30°	24°
Tilt Angle: Tomography holder	70°	70°	70°	n/a

Table 1. Selected Specifications of the F20 Series

Specimen stage

- Fully computer-controlled, eucentric side-entry, high stability CompuStage
- Maximized tilts for any X, Y, Z, α , β combination
- Choice of a variety of specimen holders including lowbackground double-tilt holder
- X, Y movement 2 mm, specimen size 3 mm
- Specimen recall reproducibility $\leq 0.1 \mu\text{m}$ (x, y) and $\leq 0.1^\circ$ (α tilt) attainable
- Drift < 0.5 nm/minute with a standard holder

Vacuum

- Fully interlocked differentially pumped column
- Clean vacuum system with turbo molecular pump, prepumping column, gun and specimen airlock

- Oil-free pumping system available (S-TWIN, X-TWIN)
- Liner tubes pumped by additional Ion Getter Pump
- Ultra-high vacuum for contamination-free observation
- Vacuum levels: specimen chamber 2.7×10^{-5} Pa; gun 5×10^{-7} Pa
- Plate camera exchange without switching off high tension or emitter.

Operation / automation

- Advanced User Interface: constantly updated and improved
- Operating system: industry standard Windows® 2000
- Remote operation available
- Motorized apertures available
- Scripting software (SW) module available
- Advanced filtering SW available
- Ready for LAN networking
- 2nd data monitor available

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 27 66 768
 Fax: +31 40 27 66 786

e-mail: sales@feico.com
 www.feicompany.com
 www.tecnai.com

Asia-Pacific Sales
 Tel: +65 351 7671
 Fax: +65 354 0644

