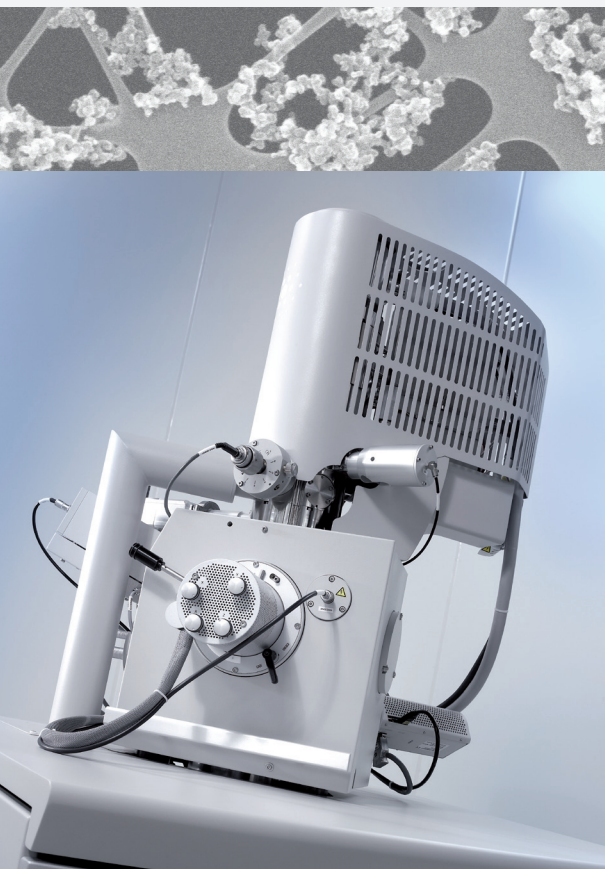




Inspect™ F50

Everything needed for conventional high resolution sample investigation

Tailored for the mainstream need to investigate a wide variety of materials and characterize their structure and composition, the easy to use Inspect™ F50 provides a high resolution, stable platform to handle most research needs. The easy-to-use interface provides accurate and fast data collection: surface and compositional images can be combined with fast elemental analysis for determining material properties and elemental composition. In many areas the value of a FEG SEM for high resolution and high current helps meet the challenges to produce top quality images and fast analysis. The Inspect F50 is the mainstream, flexible solution for these basic research applications.

The user interface is simple and easy to learn, yet flexible enough for the challenges of complex environments where individual research needs vary between projects. For example, standard navigation features include double click stage movements and drag to zoom. SmartSCAN™ technology for smart scanning strategies on difficult samples makes it easier to reduce noise and provide better data. Designed by microscopists for microscopists, this instrument series is truly above and beyond being merely 'easy to use'.

Many new features are available to help customize an Inspect F50 for particular characterization. New options, such as beam deceleration, bring low kV performance to a completely different level for a conventional FEG SEM. Nav-Cam™ color image navigation and new detectors provide even greater flexibility to the Inspect F50.

Better data. More flexibility. Higher efficiency. The Inspect F50 enables quick and simple operation to get quick answers and delivers value for the investment.

Key benefits

- Easy to use, intuitive software makes highly effective operation possible for novice users
- Increase imaging performance with high resolution secondary and backscatter imaging
- Enable analytical fast and accurate EDS and EBSD analysis with stable high current FEG (up to 200 nA)
- Minimize adjustments to the column when changing kV. All adjustments are carried out automatically upon user selection of kV and/or spotsize setting
- Enable surface imaging with high brightness FEG at lower kVs
- Utilize optional beam deceleration mode to get surface and compositional information from conductive samples

Typical applications include:

NanoCharacterization

- Metals & alloys, oxidation/corrosion, fractures, welds, polished sections, magnetic and superconducting materials
- Ceramics, composites, plastics
- Films/coatings
- Geological sections, minerals
- Soft materials: polymers, pharmaceuticals, filters, gels, tissues, plant material
- Particles, porous materials, fibers

NanoPrototyping

- Electron beam lithography (EBL)

Essential specifications

Electron optics

- High resolution Schottky field emission
- SEM column optimized for high brightness/high current
- 45° objective lens geometry with through-the-lens differential pumping and heated objective apertures
- Maximum horizontal field width: 6 mm at analytical working distance (10 mm); 8.8 mm at 25 mm WD
- Accelerating voltage: 200 V to 30 kV
- Probe current: ≤ 200 nA, continuously adjustable
- Magnification: 14 to 1000000 x

Electron Beam resolution

- High vacuum
 - 0.8 nm at 30 kV (STEM)*
 - 1.0 nm* at 30 kV (SE)
 - 2.5 nm at 30 kV (BSE)*
 - 3.0 nm at 1 kV (SE)
- High vacuum with beam deceleration option
 - 3.0 nm at 1 kV (BD mode* + BSE*)
 - 2.3 nm at 1 kV (BD mode* + ICD*)
 - 3.1 nm at 200 V (BD mode* + ICD*)

Detectors

- Everhardt Thornley SED (secondary electron detector)
- High sensitivity low kV SS-BSED*
- IR camera for viewing sample in chamber*
- Scintillator BSED/CLD*
- vCD (low voltage high contrast detector)*
- In-column detector (ICD) for secondary electrons in BD mode*
- Electron beam current measurement*

- STEM detector*
- Nav-Cam™ - color optical camera for sample navigation*
- Cathodoluminescence*
- EDS*
- WDS*
- EBSD*

Vacuum system

- 1x 70 l/s TMP (turbomolecular pump), 1x PVP
- Optional upgrade to oil free scroll/dry PVP
- 2 x IGP
- Chamber vacuum (high) $< 6 \times 10^{-4}$ Pa
- Evacuation time: ≤ 150 s to high vacuum

Chamber

- 284 mm size left to right
- 10 mm analytical WD
- 8 ports
- EDS take-off angle: 35°

Stage

- X, Y = 50 mm
- Z = 50 mm (25 motorized)
- T = - 15° - to + 75° (manual)
- R = 360° continuous
- Repeatability: 2 μ m (X, Y)
- Tilt-eucentric at analytical height (10 mm)
- X, Y movements are in the tilt plane
- Beam deceleration (cathode lens/sample bias)*

Sample holders

- Multi-stub holder
- Single stub mount, mounts directly onto stage
- Universal sample holder kit*
- Various wafer and custom holder(s) available by request*
- Universal specimen holder kit*

System control

- 32-bit graphical user interface with Windows® XP, keyboard, optical mouse
- One/two* 19-inch LCD displays, SVGA 1280 x 1024
- Software controlled switchbox*
- Joystick*
- Manual user interface*
- Scan presets

* optional

Image processor

- SmartSCAN™ scan strategy
- Drift Corrected Frame Intergration (DCFI)
- Up to 4096 x 3536 pixels (~14 Megapixel)
- File type: TIFF (8 or 16-bit), BMP or JPEG
- 256 frame average or integration

System options

- Beam deceleration
- Manual user interface
- Support PC (including 2nd 19-inch monitor)
- Cryocleaner
- Cryocleaner spare vessel
- Joystick
- Specimen current meter
- Remote control SW
- Video printer
- Specimen holder kit
- Acoustic enclosure for vacuum pump
- 7 or 52 pin electrical feedthrough
- Electrostatic beam blanker
- WDS completion kit
- Scroll pre-vacuum pump kit

Common 3rd party accessories

- EDS
- WDS
- EBSD
- Cryo stage
- Cathodoluminescence
- Sample current detector
- Nanomanipulators
- Lithography systems
- CAD navigation
- Electrical probing

Documentation and support

- On-line help
- 'Getting Started' training CD
- RAPID™ (remote diagnostic support)
- Free access to FEI for owners on-line resources
- Free membership in the FEI ESEM User Club

Software options

- Remote control/viewing software
- Image analysis software
- Web-enabled data archive software
- Height mapping/roughness measurement software

Warranty and training

- 1 year warranty
- Optional applications training class available
- Choice of service maintenance
- Choice of operation/application training contracts

Installation requirements

(refer to pre-install guide for additional data)

- Power: voltage 230 V (+ 6 %, - 10 %), frequency 50 or 60 Hz (+/- 1 %)
- Power consumption: < 3.0 kVA for basic microscope
- Earth resistance: < 0.1 Ω
- Environment: temperature 20 °C +/- 3 °C, relative humidity below 80 % RH, stray AV magnetic fields
 - < 40 nT asynchronous
 - < 300 nT synchronous
- Door width: 90 cm
- Weight: column console 530 kg
- Weight: electrical console 139 kg
- Dry nitrogen: system (0.7 to 0.8 bar, max 10 l/min during vent); dry pump (1.0 bar, 2 l/min)
- Compressed air 4 to 6 bar - clean, dry and oil free
- System chiller is only required if room is not meeting specification according pre-install instructions
- Acoustics: < 68 dBC (site survey required as acoustics spectrum relevant)
- Floor vibrations (site survey required as floor spectrum relevant)
- Vibration isolation table available as option

Energy conservation

- Energy Star compliant monitors and PC systems
- System designed to operate without water chiller

* optional