



## MLA 250

### The affordable mineral analysis solution with all the benefits of best in class automation and phase classification

The MLA 250 is an Automated Mineral Analyzer used in the natural resources industry and at public institutions. For mining applications, the tool is used to optimize the performance of mineral processing operations by means of characterizing ore and plant products. The system also categorizes rocks, ore and minerals for research and education at public institutions. Compared to traditional Optical Systems and Manual Mineral Analyzers, this automated solution significantly reduces sample analysis time without the need of operator assistance.

The MLA 250 uses a scanning electron microscope equipped with a high-speed energy dispersive X-ray spectrometer (EDS) to automatically acquire image and composition information from your samples of interest – typically polished sections of particulates from mineral processing operations and drill core, or lump materials, from exploration. Specialized mineral analysis software uses the data to acquire and measure characteristics such as mineral type and proportions, elemental distributions, grain size, liberation and association – essential properties of the ore that must be accommodated in mineral processing to achieve maximum metal recovery.

The MLA standards management system accommodates manual or automated standards collection which makes the classification of spectra from new samples more efficient. This advanced standardization procedure is then used to classify spectra collected during the measurement.

The MLA 250 exemplifies a complete mineral analysis solution at an affordable price. This easy-to-use system provides the best in automated mineralogy with a comprehensive range of modes of analysis. The flexibility of the MLA 250 can bring value to a wide variety of users at many levels and can be tailored to suit research and education requirements as well as applications in the natural resources industry.

#### Key benefits

- Automated mineral analyzer using the latest SEM, EDS and mineral liberation analysis technologies
- Best in class mineral classification capabilities
- Ore characterization and plant design applications
- Extended data reporting capabilities
- Dual high throughput EDS detectors
- High-end thermal emission analytical SEM platform (FEI Quanta™ 650)
- Holds up to 14 sample blocks
- Global sales and support network in > 50 countries

## Features & specifications

### Application and Use Cases

#### Applications

- Ore characterization
  - Evaluate exploration targets
  - Characterize the geometallurgical properties of an ore
  - Detection of nanoscale precious particles
- Plant design & optimization
  - Analyze products from batch or pilotscale separation tests
  - Grind size determination
- Metal recovery
  - Analyze concentrator feeds and tailings
  - Facilitate effective ore blending
  - Avoid metallurgically poor ore stocks
- Mineralogy Analytical services
- Research and Education at public institutions

#### Mineral Resources

- Base metals
  - Copper ore
  - Nickel ore
  - Iron ore
  - Others such as Lead, Zinc, Manganese
- Precious metals
  - PGM ores
  - Uranium ore
  - Gold ore
  - Others such as Silver, Titanium
- Industrial Minerals
- Heavy Mineral Sands

#### Other Mineral Industries

- Mineralogy Characterization applications such as:
  - Drill core mineralogy & tracer minerals (oil & gas)
  - Coal ash mineralogy (coal)
  - Polluted soils (waste management)
  - Fly ash mineralogy (cement)

#### Mineral analysis capabilities (all automated)

- Mineral classification
- Mineral abundances
- Elemental distributions
- Mineral texture
- Mineral association
- Mineral liberation

### System

#### Automated Mineral Analyzer comprising:

- Tungsten filament Scanning Electron Microscope
- Silicon Drift (SDD) Energy Dispersive X-ray detector
- Mineral Liberation Analysis (MLA) software including data acquisition, data analysis and data presentation modules
- Sample holder: 1 position for 30 mm sample block

#### Options

- Custom sample holders
  - Holders for any sample shape e.g. thin sections
- MLA Qualification and Training
  - Recommended for first time MLA users
- MLA software service contract
- Choice of SEM and EDS training arrangements

### SEM

#### Electron optics

- High performance thermal emission SEM column with dual-anode source emission geometry
- Maximum horizontal field width: 4.5 mm at analytical working distance (10 mm)

#### Resolution

- 3.0 nm @ 30 kV (SE)
- 4.0 nm @ 30 kV (BSE)
- Acceleration voltage: 200 V – 30 kV
- Probe current: up to 2  $\mu$ A, continuously adjustable

#### Detectors

- BSED, Two-segment solid state
- SED, Everhart Thornley & Low vacuum SED (LFD)
- IR-CCD

#### Vacuum

- High vacuum operating mode
- Low vacuum operating mode 10 to 130 Pa
- ESEM operating mode 1- to 4000 Pa
- 1x 240 l/s TMP, 1x PVP

#### Chamber

- 284 mm size left to right
- 10 mm analytical working distance
- 35° EDS take-off angle
- Accommodates EBSD and WDS

### Stage

- X-Y = 50 mm
- Z = 50 mm
- T = -15° to +70°
- R = 360° continuous

### System control

- 32-bit graphical user interface with *Windows*®XP SP 2, keyboard, optical mouse
- Image display: two 19-inch LCD, SVGA 1280x1024

### EDS

#### Detector type

- Silicon Drift (SDD)
- 10 mm<sup>2</sup> or 30 mm<sup>2</sup> active area
- Energy Resolution: ≤ 133 eV
- Ultra-fast pulse processing
- No liquid nitrogen required
- Elemental mapping and spectrum quantification capabilities included
- Choice between EDAX or Bruker platforms with regional preference.

### Automated Data acquisition, analysis and presentation

#### MLA software suite

- Measurement program
  - SEM and EDS control
  - Standards collection
- Processing program
  - Image processing and classification tools
  - Mineral database management
- Data presentation program (DataView)
  - View data in tabular or graphical form
  - Compare, combine and filter data sets
  - Group minerals
  - Mineral abundance (modal analysis) and sample elemental distributions (assay)
  - Particle and grain size distribution
  - Mineral associations, liberation and locking
  - Theoretical grade-recovery curves
  - Particle densities and shape factors

### Measurement modes

- BSE – image
- X-BSE – image + X-ray
- SPL – specific particle liberation
- RPS – rare phase search
- XMOD – X-ray modal composition
- PXMAP – particle X-ray mapping
- SXMAP – selected particle X-ray mapping
- GXMAP – image + X-ray map (Ford method)
- SX-BSE (Lätti method)
- Dual Zoom (Schouwstra method)
- Dual Dwell (Moeller method)

### Installation requirements

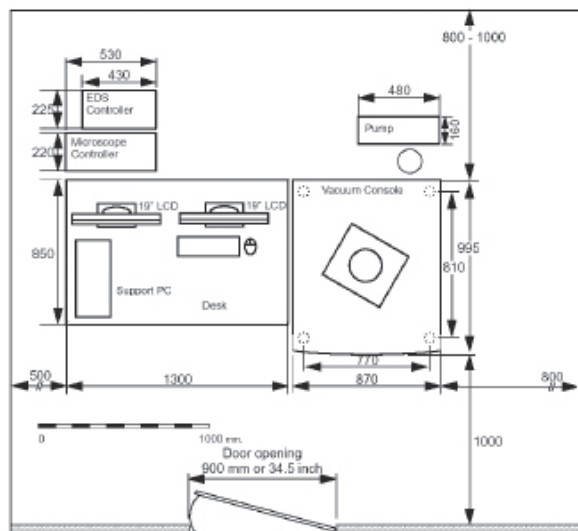
(refer to pre-install guide for additional data)

- Power: voltage 230 V (+ 6 %, -10 %), frequency 50 or 60 Hz (+/- 1 %)
- Power consumption: < 3.0 kVA for basic microscope
- Environment: maximum temperature range for operation 15 °C to 25 °C, relative humidity below 80 % RH
- Stray AV magnetic fields < 40 nT asynchronous
- < 300 nT synchronous
- Acoustics: < 68 dBC
- Door width: 90 cm
- Weight: column console 751 kg

### Service contracts

- Comprehensive contracts (preventive and corrective maintenance included)
  - 5 x 8 hours, 72 hours on-site response time
  - 5 x 16 hours, 24 hours on-site response time
- Choice of preventive maintenance contracts only

### Floor Plan



Learn more at [FEI-natural-resources.com](http://FEI-natural-resources.com)

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TUV Certification for design, manufacture, installation and support of focused ion- and electron-beam microscopes for the Electronics, Life Sciences, Research and Natural Resources markets.

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