

### DELTA Handheld XRF for Mining and Exploration



Fast, Decisive Results for Mining Exploration, Grade Control, Processing and Environmental Management



# The DELTA Handheld XRF

## for Mining and Exploration

Olympus is the specialist manufacturer of portable geochemical analyzers for the global exploration and mining industry. Our comprehensive in-house expertise in utilizing technology for field geological scenarios sets us apart from the rest.

The advanced analytical performance and broad element suite of the DELTA Mining and Exploration Handheld XRF means there is an Olympus field portable XRF for nearly any geological situation.

### The Powerful Handheld XRF that Can Be Taken Anywhere



### Get Fast Results for Immediate Action

Field experience has shown that there are several very important considerations for the successful implementation of any portable XRF program: 1. initial orientation survey; 2. testing times; 3. sample representativeness, homogeneity,

and sample prep; 4. site/sample specific calibrations; and 5. a solid QA/QC program which includes the testing of blanks, certified reference materials, and performing confirmatory lab analysis.

- Base metals: Cu, Pb, Zn, Ag, Mo
- Gold, including pathfinders and litho-geochemistry
- Uranium +/- rare earth elements; pathfinders
- Nickel Sulfide and Laterite deposits
- Iron Ore and Bauxites
- Rare Earth Element (REEs) such as La, Ce, Pr, and Nd

- REE pathfinders including Y, Th, and Nb
- Phosphates and potash
- Epithermal Sn, W, Mo, Bi, Sb deposits
- Mineral sands- Ti, Zr
- Coal, oil and gas
  - Mud logging and trace element chemistry

# Mineral Exploration and Mining Application

## Why Should you Choose Olympus DELTA Handheld XRF?

- Specifically and purposefully designed instrumentation for infield mining and exploration uses
- A specialist International Mining Group (IMG) created to focus solely on XRF and XRD analysis technology
- IMG is staffed by experienced geological industry professionals who understand your business needs
- Our commitment to long term partnering with exploration and mining companies- we stand by our technology and service over the long term

## The International Mining Group Focuses On

- Pioneering technological advancements and geology-focused innovations
- Advanced training programs and ongoing global support
- Specialist commodity calibrations and development of innovative applications
- Mineral-specific accessories
- Comprehensive methodology development and data management solutions
- Real-time data integration with GPS and GIS

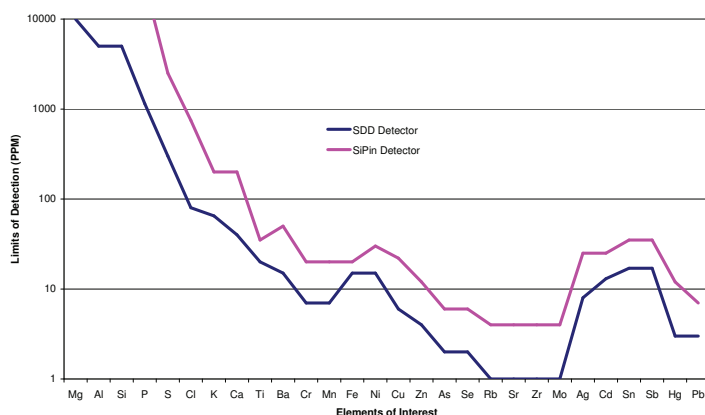
## DELTA Handheld XRF Configuration



The DELTA brings the power and flexibility of handheld X-ray fluorescence spectrometry to the field. Ruggedized and ultra portable, this dramatically fast 24/7 technology provides accelerated testing times, allowing for hundreds more tests to be conducted per day with analytical confidence.

The DELTA series analyzers are configured with powerful miniature X-ray tubes, Si-PIN detectors or highly advanced Silicon Drift Detectors (SDD), specialized filters, and multi-beam optimization for the ultimate in XRF field analysis. The DELTA's real overall value is to help make decisions in real time with minimal reliance on off-site laboratory testing. The 50kV DELTAs are optimal for Ag, Sb, Te, Ba, and REEs.

DELTA Limits of Detection



Some Typical LOD's\*

Mg	~ 0.5%
Al, Si	~ 0.1%
P	~ 500 ppm
S	~ 100 ppm
K, Ca	~ 20-30 ppm
Ti, V, Cr	~ 5-10 ppm
Mn, Fe, Cu, Pb, Zn	~ 3-5 ppm
As, Mo, Sr, Rb, Zr, U, Th	~ 1-2 ppm
Ag, Cd, Sn, Sb	~ 5-10 ppm
Au	~ 5-7ppm

\*Typical results for 120 sec test per beam using Soil and Mining modes in Silica matrix



# The Business Case for Portable XRF

## for Exploration, Mining and Metallurgical Processing



DELTA for grade control



DELTA in Soil Foot

### Mineral Exploration

For exploration applications, the average return on investment (ROI) timescale is typically six (6) months. This varies on a project by project basis. Olympus analyzers enable:

- Due diligence during property acquisition and deal making
- Qualitative chemistry of rock, chips, soil, and sediments at the early regional reconnaissance and mapping stages
- Quantitative data during first pass regional soil, sediment, till, and trenching stages
- Immediate identification of mineralized trends/anomalies, definition of drill targets, extension of soil sample lines
- Adaptation of sampling and mapping programs in real time to maximize exploration budgets
- Pre-screening of samples to maximize efficiency of off-site laboratory testing
- Increasing sample density in the most prospective areas
- Analysis of air core, RAB, RC and diamond core samples during drilling phase as samples come out of the ground
- Onsite quantification of REEs including La, Ce, Pr, and Nd, and pathfinders such as Y, Th, and Nb

### Mining & Metallurgical Processing

Portable XRF can provide productivity increases through on-site, immediate geochemical analysis results. Make decisions on the spot:

- Instantaneous screening of blast hole samples in open pits allows for more efficient movement of ore/waste material by reducing the reliance on the mine laboratory
- Field analysis of stockpiles assists rapid blending and feeding to the mill
- Real time analysis of feeds, concentrates, and tails allows immediate dosing adjustments to be made in the processing plant
- Underground grade control can be improved in certain settings by establishing sampling and analysis methodologies. Olympus XRF's aid the decision making process at the underground face in many underground mines around the world on a daily basis
- Sample and matrix specific calibrations are usually required for mine-site applications. The DELTA is designed to be very easy to set up and use with multiple calibration models to ensure optimal performance – even for challenging light element (Mg, Al, Si) analysis



DELTA for bagged samples



DELTA for core samples



# The Xplorer Package

## Mobile GPS-GIS Mapping Solutions for your XRF

Pioneered by the International Mining Group geologists, the DELTA XRF-GPS-GIS Xplorer configuration provides seamless connectivity between XRF and GIS for rapid targeting and real time decision making.

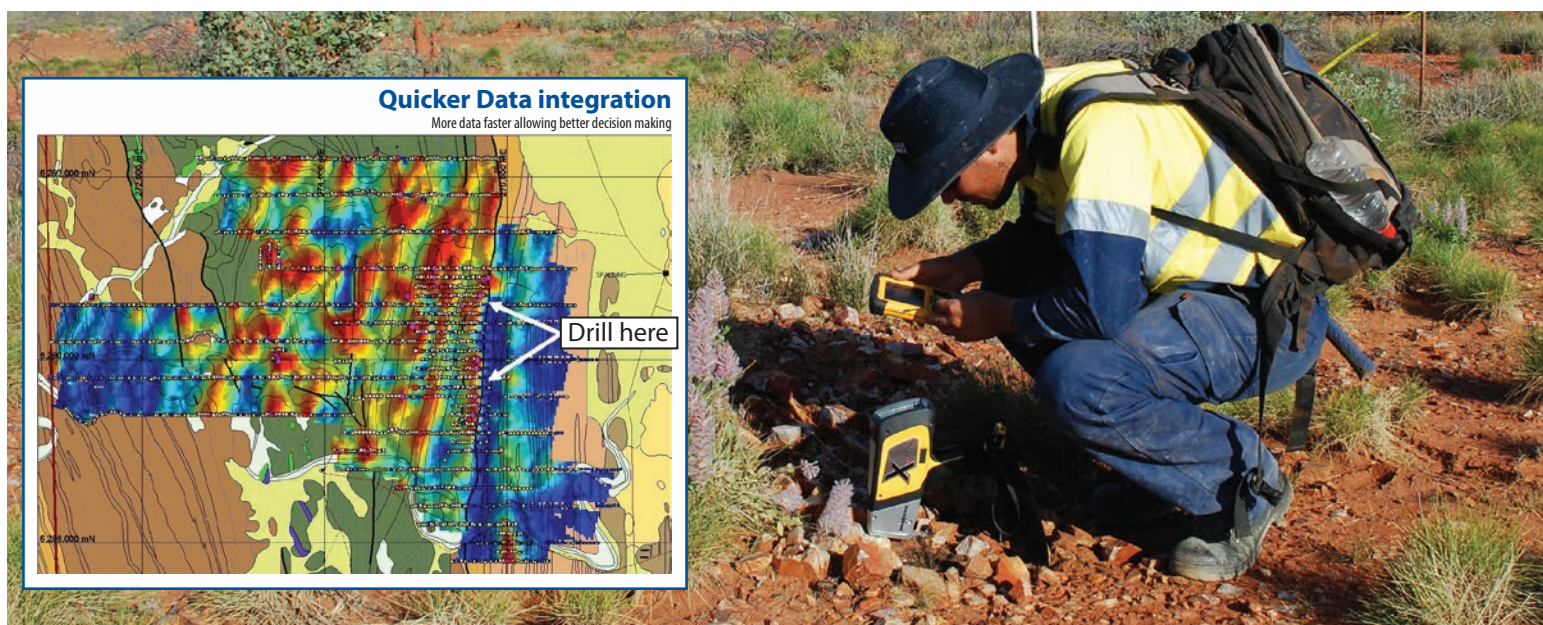
The outcome for the exploration geologists is time and cost savings, improved data integrity, and an integrated, automated data management and validation process. The ability to map, visualize, assess, and follow up on targets immediately has genuinely changed surface soil/sediment geochemical exploration methodologies for the better.

Field Portable XRF data is transferred wirelessly, and spatially registered in real time using industry-standard Mobile GIS and State of the Art Trimble GPS Hardware, in addition to GIS Software (ArcPAD or Discover Mobile).

- The result is live geochemical mapping in the field for visualization, gridding, and contouring in GIS, leading to rapid, informed decision making
- Seamless integration into powerful geochemical analysis software such as ioGAS for first class data validation and QA/QC
- Reduces human error related to XRF data transfer, GPS coordinate merging, and GIS integration



Third Party Software  
(ioGAS/ ioHUB/ ArcGIS/ ENCOM Discover/ MAPINFO)



# The DELTA Series

## Everything You Need in Handheld XRF with State-of-the-Art Innovation

The New Generation DELTA Handheld XRF Analyzers are ergonomically advanced with a forward looking design incorporating the latest in electronics, components, and software technology.



### DELTA Professional

The DELTA Professional with a 40kV tube and SDD detector is the best value solution from Olympus for handheld XRF analyzers. It provides superior performance in speed, LODs, and elemental range.



### DELTA Premium

The DELTA Premium with advanced 40kV tube and large area SDD detector is best for ultra quick, analytically demanding applications, such as trace levels and light elements in low alloy steel, soil, mining, and metallurgical samples.

Some DELTA Premium models can be configured with a 50kV tube to optimize LODs for high-Z and challenging elements, such as Ag, Cd, Sn, Ba, Cr, Sb, Te, and Rare Earth Elements (REEs).



### DELTA Classic Plus

The DELTA Classic Plus with a 40kV tube and Si-PIN detector is ideal for simple applications. It provides quick ID, screening, sorting, and elemental and metals analysis.

The newly available DELTA X-act Count Technology can provide even better sensitivity and precision in faster time for more materials than before. Throughput is increased with the same or better precision in half the time for most elements.

#### Features and Benefits

Powerful 4W X-ray tube, 200  $\mu$ A current (max), optimized beam settings

Tight geometry for exceptional LODs and high analysis throughput

Large-Area SDD and customized X-ray tube options for exceptional sensitivity and precision for more elements and materials

Patent-pending automatic barometric pressure correction that adjusts calibration as needed for more accurate analysis of light element.

Lightning-fast data acquisition for faster testing time

Floating Point Processor: Provides more calculations in less time, and leverages more advanced calibration algorithms

Integrated Bluetooth® for data input and output available in most countries

Integrated wide area heat sinks throughout the DELTA body for high power use in extreme temperatures

Analysis indicator lights visible from 360° to help ensure safe use

Advanced colortouch LCD screen for clarity, brightness, responsiveness, and energy efficiency for indoor/outdoor use

Accelerometer technology puts the unit into sleep mode to save energy when not in use; logs impacts for tool management

DELTA PC Software for enhanced data analysis, calibration modeling, and optional closed beam workstation operation

USB interface port for high-speed downloads and seamless PC control

Ergonomic rubberized handle for enhanced grip

Docking Station and Hot Swap Batteries



The unique DELTA Docking Station frees you from having to power down the analyzer. The station charges the analyzer battery and a spare, and performs periodic calibration checks. DELTAs can be operated 24/7 in the field with hot swap battery replacement.



## DELTA Field Accessories

A variety of accessories and options are available to take full advantage of the DELTA Handheld XRF in the field. From portable bench-top setups for prepped samples to XRF-GPS-GIS setups for full-scale, large area, in-situ instant metal mapping, these accessories help maximize efficiency of field XRF testing.



DELTA accessories and options on this page are optional and can be coupled with an initial purchase or at any time after.



### 1. DELTA Portable Workstation

Portable workstation with integrated safety-lock shielding is convenient for bagged, prepped, filters, dust wipes and liquid samples or for multiple small objects; a PC is connected for remote control of this closed-beam DELTA set-up.

### 2. DELTA Holster

The holster keeps the DELTA by your side and within easy reach.

### 3. DELTA Soil Foot

The soil foot provides hands-free analysis with the DELTA for long testing times.

### 4. DELTA 50kV Safety Shield

The safety shield provides additional shielding from open beam radiation for field use of the full 50kV power.

### 5. DELTA Xplorer

The Delta XRF-GPS-GIS Xplorer Configuration provides seamless connectivity between XRF and GIS for rapid targeting and real time decision making.

### 6. DELTA Soil Stick

The soil stick minimizes wear and tear on your back and knees and provides push button operation of the DELTA from an adjustable height. It's most applicable for in-situ testing on large scale soil geochemistry and environmental programs.

## The DELTA Line

The DELTA series handheld XRF analyzers are configured with powerful miniature X-ray tubes, Si-PIN, or highly advanced Silicon Drift Detector (SDD) detection, specialized filters, and multi-beam optimization for the ultimate in XRF field analysis.

### DELTA Specifications\*

	DELTA Premium	DELTA Professional	DELTA Classic Plus
Excitation Source	4W Rh, Au, or Ta anode (per application) X-ray tube	4W Ag, Rh, Au, or Ta anode (per application) X-ray tube	4W Au or Ta anode X-ray tube
Detector	Large-Area Silicon Drift Detector	Silicon Drift Detector	Si-PIN Diode Detector
Analytical Range	Alloy and Mining: Mg and up for Rh/Ag and Al and up for Ta/Au; Soil: P and higher		Alloy and Mining: Ti and higher; Soil: P and higher
Weight	1.5 kg (3.25 lbs) without battery		
Dimensions	260 × 240 × 90 mm (10.25 × 9.5 × 3.5 in.)		
Environmental Temp Range	-10 °C to 50 °C (14 °F to 122 °F)		
Processing Electronics	530 MHz CPU with integrated FPU with 128 MB RAM; Proprietary Olympus Digital Pulse Processor (DPP)		
Smart Electronics	Accelerometer; Barometer for atmosphere pressure correction of light elements' measurements		
Power	Rechargeable Li-ion battery; Hot-swap maintains analyzer power during battery charge		
Data Display	32 bit Color QVGA resolution, Blanview transmissive backlit touchscreen; 57 × 73 mm (2.25 × 2.9 in.)		
Data Storage	1 GB microSD (stores ~75,000 readings)		
Data Transfer	USB, Bluetooth®		

### Standard Accessories

- Waterproof Carrying Case
- Two (2) Li-ion Batteries
- Electronic User Manual and User Interface Guide and Printed Quick Start Guide
- Docking Station
- Mini USB Cable
- 316 Stainless Steel Calibration Check Reference Coin
- Ten (10) Spare Windows
- Integrated Wrist Strap
- DELTA PC Software
- Factory Authorized Training and Support

[www.olympus-ims.com](http://www.olympus-ims.com)

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