



HANDHELD XRF MINERAL ANALYZER

Handheld XRF Mineral Analyzer - ToronXRF™ 3000M

Handheld XRF Mineral Analyzer gives geologists, mine surveyors, and environmental teams on-site elemental analysis of minerals, raw ore, and soil without waiting on laboratory turnaround. The ToronXRF™ 3000M uses energy dispersive X-ray fluorescence to identify and quantify elements in rock, ore, and drill samples in as little as two seconds, bringing benchtop-comparable detection limits to the field. Built-in GPS tags every measurement with altitude, latitude, and longitude, so results map directly into exploration and grade-control records.

A digital signal processor and silicon drift detector give the ToronXRF™ 3000M the sensitivity needed for reliable ore grade identification, while multiple calibration modes adapt the instrument to different mining environments and mineral matrices. A 5-inch touchscreen that rotates a full 360 degrees stays readable on an open rock face or in a dim underground drift, and waterproof, dustproof housing holds up across exploration sites, core shacks, and processing facilities.

Geologists use the ToronXRF™ 3000M to locate ore deposits, screen mine surroundings for heavy metals, and evaluate mine environmental conditions directly at the outcrop or drill site. The instrument analyzes solid, liquid, and powder samples without preparation, and its light-element detection capability, achieved without a helium purge, extends coverage to minerals where light elements are diagnostic.

APPLICATIONS

Handheld XRF Mineral Analyzer - ToronXRF™ 3000M Applications

The Handheld XRF Mineral Analyzer supports elemental analysis across mineral exploration, mine operations, and environmental monitoring.

- Mineral Exploration and Geological Survey: identifies ore deposit locations and geochemical anomalies directly at the outcrop to guide drill targeting

- Ore Grade Control: verifies elemental content of raw ore and concentrates during mining production to support real-time grade decisions
- Drill Core and Chip Analysis: screens drill cores, cuttings, and chips on-site to prioritize samples for laboratory assay and speed up decision-making
- Mine Environmental Monitoring: measures heavy metal content in soil surrounding mine sites to evaluate environmental conditions and potential
- Tailings and Concentrate Analysis: checks elemental composition of tailings and processed concentrates during beneficiation and enrichment
- Mining Production and Processing Control: supports quality control at the processing plant by verifying ore and concentrate composition before further processing
- Geochemical Mapping: builds georeferenced elemental datasets using built-in GPS tagging for import into GIS and mapping software
- Academic and Field Geoscience Research: gives researchers a portable tool for elemental characterization of rock, soil, and mineral samples in the field

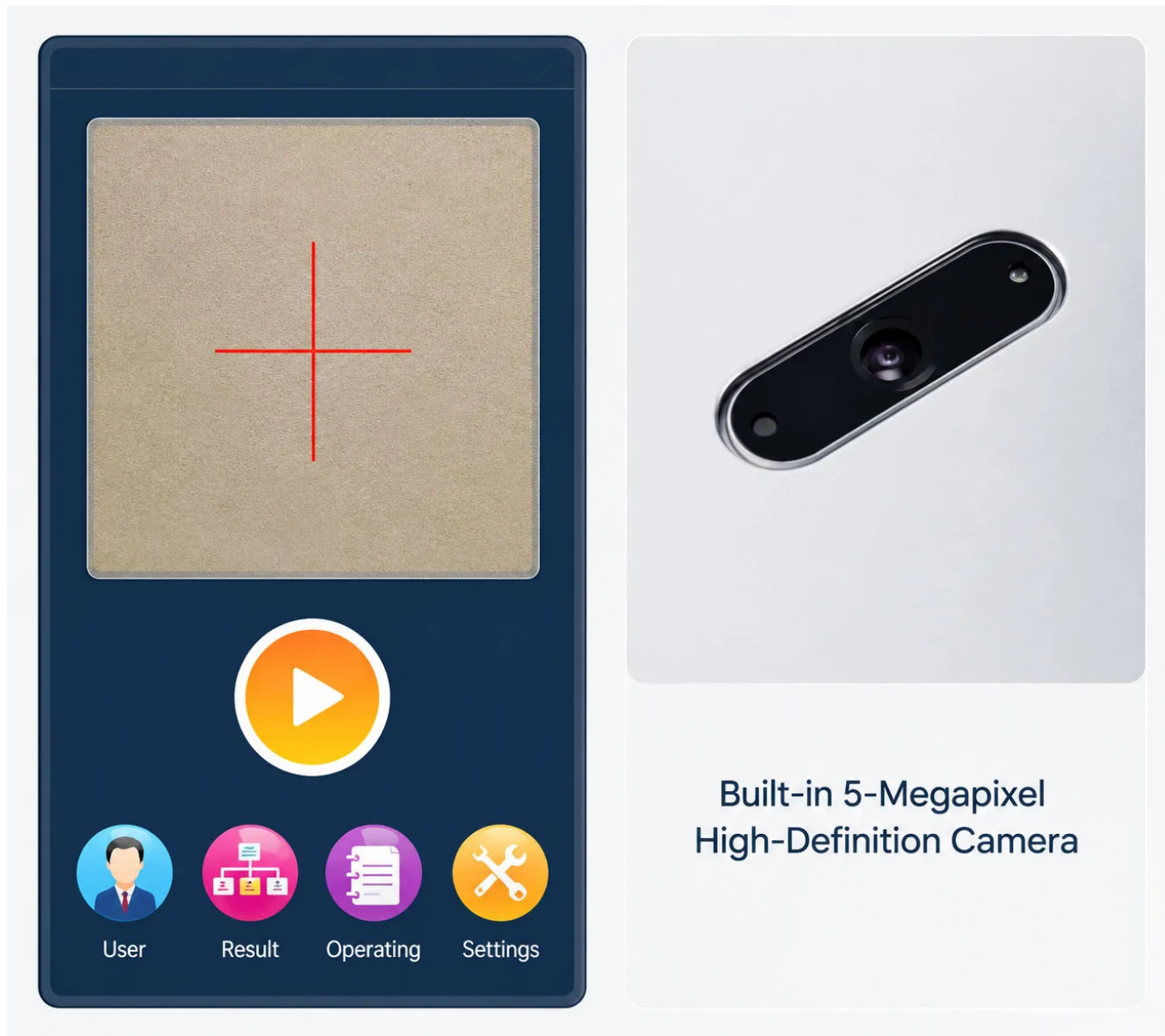


FEATURES

Handheld XRF Mineral Analyzer - ToronXRF™ 3000M Key Features

The ToronXRF™ 3000M combines benchtop-level elemental analysis with a rugged, field-ready design built for exploration work.

- Built-In GPS Tagging: records altitude, latitude, and longitude with every measurement for direct import into GIS and geochemical mapping software
- Multiple Calibration Modes: adapts elemental analysis to different mining environments and mineral matrices without sending samples to a lab
- Two-Second Ore Analysis: delivers elemental composition results as fast as two seconds for efficient field screening of large sample volumes
- Light Element Detection: resolves light elements without a helium purge, supporting mineralogical interpretation of matrices where light elements matter
- Digital Multi-Channel Processing: processes spectral data at up to 500,000 counts per second for spectral resolution that approaches benchtop XRF performance
- 360-Degree Rotating HD Touchscreen: keeps the 5-inch display readable on open rock faces, in underground workings, and in bright outdoor light
- Waterproof and Dustproof Housing: withstands exploration sites, core shacks, and processing facilities without sacrificing measurement accuracy

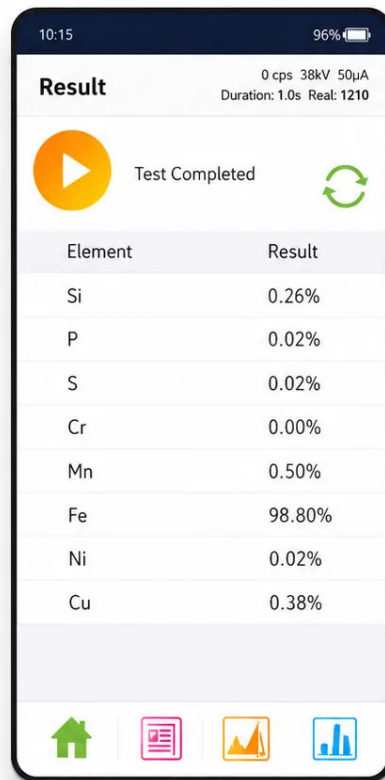


- Built-In 5-Megapixel Camera: lets operators confirm exact sample positioning before and during each measurement
- Automatic Collimator and Filter Switching: adjusts beam geometry and filtration automatically to match different sample types and mineral matrices

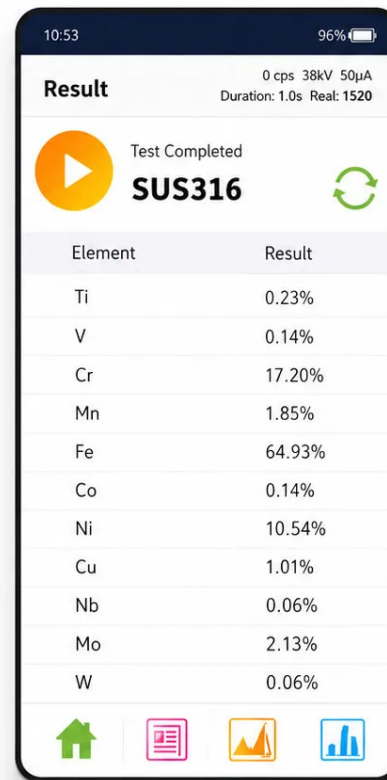
- Multi-Layer Radiation Safety System: combines automatic tube shutoff without a sample present, a lead-coated steel housing, and a rubber scatter shield with a manual security interlock that blocks unauthorized software control
- Color-Coded Status Indicator: signals power, active testing, and fault conditions at a glance through a green, red, and yellow warning light system
- Dual Operator and Expert Software Modes: gives field technicians a simplified one-step workflow while offering geologists full access to advanced calibration settings
- Extended Battery Life: runs up to 12 hours on the standard 9,000mAh battery, with an optional 27,000mAh battery extending runtime to approximately three days



**18K Precious Metal
Detection**



Low Alloy Steel Test



Alloy Test

THEORY & METHOD

Theory and Method

Energy dispersive X-ray fluorescence identifies elements in minerals and ore by exciting the sample with a primary X-ray beam and analyzing the fluorescent radiation that returns. When a high-energy photon strikes an atom in the sample, it can eject an inner-shell electron through the photoelectric effect, leaving a vacancy. An electron from an outer shell fills that vacancy and releases the energy difference as a fluorescent X-ray photon with an energy unique to that element, which the instrument reads as an elemental fingerprint within the rock or soil matrix.

The ToronXRF™ 3000M generates its excitation beam with a miniature silver-target X-ray tube operating at up to 50kV and 200uA. A silicon drift detector measures the energy of each returning photon individually, and digital multi-channel processing technology sorts these measurements into a spectrum at rates up to 500,000 counts per second. Peak position identifies which elements are present, while peak intensity indicates relative concentration, letting the instrument report ore grade and element content directly at the sample site.

Multiple calibration modes adjust the fundamental parameters model to match different mining environments and geological matrices, from silicate-rich host rock to sulfide ore bodies. Automatic collimators and six switchable filters shape the excitation beam to optimize sensitivity across the element range, allowing the ToronXRF™ 3000M to resolve light elements important to mineralogy, such as aluminum, silicon, and magnesium, without a helium purge.

TECHNICAL SPECIFICATIONS

Handheld XRF Mineral Analyzer - ToronXRF™ 3000M Technical Specifications

Parameter	Specification
Analytical Method	Energy dispersive X-ray fluorescence (EDXRF)
Elemental Range	Atomic number 12 to 92 (magnesium to uranium)
Simultaneous Elements	Up to 40 elements

Parameter	Specification
Detection Time	1 to 60 seconds
Content Range	ppm to 99.99%
Detection Limit	Approximately 5 ppm (element and matrix dependent)
Detector	SDD detector, optional Fast-SDD detector
Detector Resolution	128 eV
Excitation Source	50kV / 200uA silver-target miniature X-ray tube with integrated high-voltage power supply
Collimator and Filter	4.0mm and 2.0mm collimator diameters, 6 filters with automatic switching
Sample Types	Solid, liquid, powder
Data Processing Technology	Digital multi-channel processing, up to 500,000 counts per second
Application Convenience	Intelligent curve matching, multiple calibration modes for mining environments
Location Data	Built-in GPS with altitude, latitude, and longitude tagging
Video System	5-megapixel high-definition camera
Display	5-inch transfective LCD touchscreen, 360-degree rotation
Connectivity	GPS, WiFi, Bluetooth, waterproof mini USB, SPI data transmission
Microcomputer	1 GHz CPU, 1GB system memory, expandable to 32GB storage
Voltage	Rechargeable lithium battery, standard 9,000mAh (up to 12 hours), optional 27,000mAh (up to 3 days); 110V to 220V universal charging adapter
Operating Temperature	-20°C to +50°C
Operating Humidity	90% or less

Parameter	Specification
Dimensions	244mm (L) × 90mm (W) × 330mm (H)
Weight	1.7 kg

Included Accessories

Item	Description
Standard Battery	9,000mAh rechargeable lithium battery
Spare Battery	Optional 2,700mAh battery for extended field use
Travel Case	Heavy duty travelling case with foam insert for safe transport
Bluetooth Printer	Optional portable Bluetooth printer for on-site report printing
Car Charger	Optional vehicle charging accessory
Table Stand	Optional portable test bench stand for bench-style measurement



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