PXRF

CTX

Portable Benchtop XRF Analyzer
for Elemental Analysis

Innovation with Integrity

Portable Elemental Analysis From Mg To U

No matter what requirements you have and what samples you want to examine, applications for the CTX are almost limitless as this portable XRF analyzer can measure solids, liquids, and powders wherever they are found or used. Typical applications are not only alloy identification and quality control, scrap metal recycling, analysis of precious metals and wear metals in oil, but also mining, environmental, agriculture, food and consumer safety applications. Fast analysis speed and exceptional accuracy when measuring the elemental composition of a sample make the CTX the ideal choice for analyzing and sorting multiple sample types including incoming material, finished goods and production parts with non-destructive XRF spectrometry.

Figure 1
CTX Portable benchtop XRF analyzer

Highlights

- Latest graphene window SDD technology
- Patented DetectorShield™ for guaranteed detector protection
- New optimized X-ray source
- Superior count rate of up to 450 kcps enables an very fast analysis
- Patented SharpBeam™ collimator for improved analysis precision
- Excellent trace element sensitivity and very low detection limits
- Fast analysis of light elements, such as magnesium, aluminum and silicon
- Camera and small spot options for accurate measurement positioning
- Wide range of matrix matched calibrations available including alloys, precious metals, soil, mining, restricted materials, metal coatings
- Fully customized calibrations available
- Easy data transfer with USB flash drive

Latest XRF Technology

The CTX portable benchtop spectrometer is based on the principle of energy dispersive X-ray fluorescence (EDXRF) to detect a broad range from elements as light as magnesium (Mg) to those as heavy as uranium (U). It is ideal for quick and non-destructive analysis of small or prepared samples, i.e. solids, powders and liquids, and wherever fast and accurate testing is needed outside the laboratory. The CTX delivers precise and reproducible results with speed and ease.

Weighing just 7.5 kg (15.6 lbs) including battery, the CTX is among the lightest benchtop XRF analyzers on the market and particularly advantageous for organizations or locations with strict open beam portable XRF regulations.

Operator Friendliness

The CTX is all about high performance EDXRF in a small, lightweight and sleek configuration. Designed as a self-contained and safety interlocked portable analyzer, the CTX requires minimal setup and operator training. The front panel touchscreen user interface has been designed to provide intuitive operation and results presentation. Data management and transfer are exceedingly easy to use.

Equipped with both user-level and supervisor-level access, a manager can choose to grant basic operator control or full functionality. This two-tier approach and intuitive interface make the CTX perfect for both beginning users, as well as power users.

At under 7.5 kg and less than 27 cm high, the CTX is truly portable and takes up very little space on any surface. It fits securly into its standard Pelican case or an optional protective backpack. Samples can be placed as-is inside a safety chamber with ample room, or in sample cups, baggies or other containers. The completely sealed sample plate protects the CTX from spills.

Design and Performance

The CTX analyzer is based on the latest detector technology. The spectrometer is equipped with a high-performance graphene window silicon drift detector (SDD) enabling fast and precise analysis.

The CTX delivers outstanding performance, an exceptionally broad application range, and superior sensitivity for light elements such as Mg, Al, and Si.

IP54 rated, the CTX is designed to withstand field operation in all environments, including humid and dusty conditions. Its durable splash proof stainless steel body is easy to clean.

- Safety interlocked sample chamber W x D x H = 12 cm x 13.5 cm x 8.5 cm (4.7 in x 5.3 in x 3.3 in)
- Sealed against moisture and windblown dust
- Sealed spill plate protects X-ray tube and detector for long term performance
- Operating temperature -10°C to +40°C
- Industrial, easy access, front touchscreen display

Comprehensive Features

Latest Graphene Window

The CTX analyzer incorporates a large area graphene window silicon drift detector (SDD) that replaces the traditional 8 µm beryllium window. This groundbreaking window is one of the first commercial uses for graphene, an advanced material composed of atomic layers of carbon atoms arranged in hexagonal lattices. While the graphene is extremely thin its unique structure makes it extremely strong.

The graphene window has higher transmission of X-rays throughout the energy spectrum and dramatically improves the transmission for light elements such as magnesium (Mg), silicon (Si) and aluminum (Al). This improved light element sensitivity enables lower detection limits and faster analysis of these critical elements.

SharpBeam™ Optimized Geometry

The CTX is precision built with Bruker's patented SharpBeam™ Optimized Geometry including benefits, such as:

- produces a sharp, defined measurement spot
- improves measurement precision
- reduces power requirements
- reduces stray scatter
- increases battery life
- reduced instrument weight

Integrated Camera and Small Spot Collimator

The CTX can be equipped with an integrated camera (640 x 480 pixels) to provide sample visualization and accurate positioning of the measurement spot. The 3 mm small spot provides a small measurement area for the isolation of small features to be tested. Thanks to the CTX's SharpBeam™ optimized geometry, the precision and accuracy of the measurement with small spot collimator are the same as for the normal spot. There is no need to extend measurement time to achieve the desired precision.

- a small spot isolates a specific sampling area
- the camera ensures accurate measurement positioning
- up to five images per assay can be saved (provides record of measurement spot)
- simple import of images into the reports
- no loss of accuracy with the small spot option

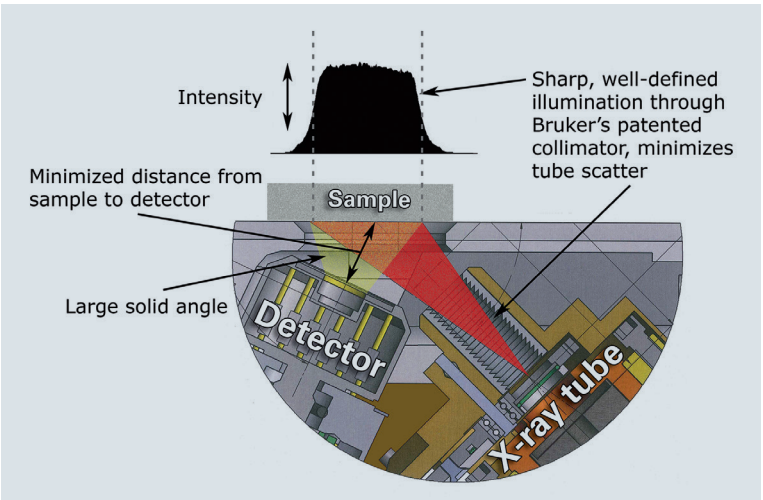

Figure 2
SharpBeam™ Optimized Geometry

Detector Shield™ – The Ultimate Defense against Punctured Detectors

This unique patented CTX feature protects the detector window from being punctured by sharp objects like scrap shavings and wires, while still allowing rapid and accurate analysis of almost any material.

- guaranteed lifetime protection against detector punctures
- no need to change window or calibration when measuring light elements
- no sacrifice to analytical performance, even when measuring light elements such as Mg, Al or Si

SMART Grade™ – System Monitored Automatic Run Time

The CTX 800 alloy application is equipped with Bruker's SMART Grade™ calibration. It automatically determines the optimized conditions and measurement times for each alloy measured.

- optimum measurement conditions for every alloy
- multiple condition measurement when required
- fast measurement (2 - 3 s) for standard alloys
- automatically extended measurement times (5 - 15 s) for alloys containing light elements

Grade Library

The CTX alloy application includes extensive grade libraries for accurate alloy identification, more than 1,000 grade definitions cover the most common international standards. User selectable libraries are EN-DIN, JIS, GB and others, covering multiple alloy classes, e.g. low alloy steels, tool steels, various metal alloys, brasses, bronzes, and many more.

Calibrations

Ready-to-go factory calibrations are available for a varity of applications including food quality and saftey, plant and soil health, natural resource exploration, alloy and precious metal identification and regulated sulfur in marine fuel. Calibrations can be customized to perfectly fit specific requirements. Available calibrations depend on instrument model.

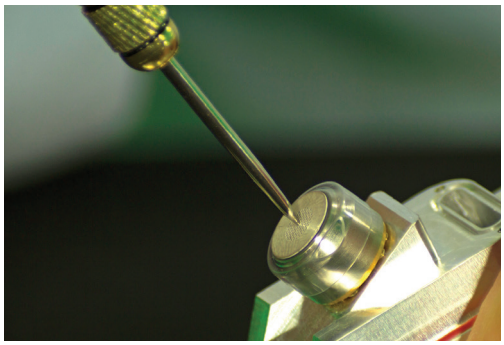

Figure 3
Dart tip on the Detector Shield™ for size comparison.

Data Management

The Bruker Instrument tools software package enables instrument control, measurements and communications.

- Bruker Instrument tools communicates with the instrument and manipulates data from the CTX. Features include: Report generator, Grade table editor, Spectrum viewer, software updates and other features to maintain the instrument.
- RemoteCtrl connects to your instrument using USB connection. Once the unit is connected you can operate the instrument remotely with your PC.

Measurement results, captured images, spectra and sample identification data are stored in a single protected file for easy storage and access. The results are available in both a protected and unprotected file format. The unprotected file format can be imported directly into MS Excel® or other database programs. Data may be stored in internal instrument memory or a USB flash drive or both. The assay's GPS coordinates can be exported to GIS compatible software.

Data import and export can be streamlined with optional Bluetooth accessories, such as a wireless external GPS receiver providing GPS coordinates, a bar code reader and a portable, ruggedized thermal printer.

Applications

The CTX portable benchtop XRF analyzer enables you to take a powerful elemental analyzer to your sample instead of sending it off to a lab and waiting for results. Results can be viewed as identified metals and alloys, elemental composition, pass/fail using preset concentration thresholds, and full spectra. Typical applications include:

Natural Resource Exploration

With its highly flexible measurement options and multi- element sensitivity, the CTX enables high-quality analyses of mining and mineral samples:

- Analyze geochemistry of soil, sediment, ores, mudrock, drill cores, concentrates
- Measure major, trace and specialty target elements such as uranium
- Collect real-time elemental data while dilling on land or on the water

RoHS and Consumer Safety

The CTX meets RoHS directives for testing electronics and other recycled products for dangerous levels of Pb, As, Br, Cr and Cd. It is a critical tool for fast, non-destructive screening of consumer products including toys, childrens jewelry, clothing, decorative objects and personal care products (right).

Metal Analysis

The CTX is the perfect solution for portable metal and alloy analysis. It is ideal for analyzing and sorting incoming material, finished goods and production parts. Applications include positive material identification (PMI), metal scrap recycling, metal trace and tramp element analysis, quality control of the correct alloy grade, and precious metals recycling, i.e.,

- Identify gold, silver, platinum, palladium and other valuable metals
- Determine gold karat rating
- Analyze auto-catalysts for precious metal recovery

Environment and Agriculture

The CTX provides comprehensive field portable solutions to screen for soil and plant health and the presence of dangerous elemental pollutants in air, water and soil (right):

- Monitor heavy metals and elemental nutrients to confirm healthy, sustainable land and effectiveness of remediation
- Analyze heavy metal and elemental nutrient uptake of plants and leaves
- Determine elemental properties of area soil, irrigation sources and fertilizer to optimize crop quality and yield for smart farming

Food Safety and Quality

The CTX is an essential tool for monitoring additives and process indicators during food production, analyzing mineral nutrients in food and feed, and screening for dangerous levels of toxic elements:

- Perform quality analysis at critical control (QACC) points of raw materials and finished products as well as during process
- Perform hazardous analysis at critical control (HACC) points for adulterant and toxic metal contaminant identification
- Analyze food content for fortificants such as Fe and Ca in milk liquid and powder

Oil and Fuel Inspection

The CTX is an essential tool for monitoring additives and process indicators during fuel production:

- Check sulfur in fuel as per MARPOL
- Monitor oil blending
- Screen wear metals in oil
- Analyze used oil

The CTX portable XRF analyzer allows the input of threshold concentration values of sulfur, heavy metals or other elements to enable quickly identifiable compliance results.

Technical Specifications	
Detection	Graphene window silicon drift detector (SDD), 20 mm^2 detector area, typical resolution < 145 eV at 450,000 cps inlcuding Detector Shield™
Excitation	Rh target tube, 4 W, 6 - 50 kV, 5 - 200 µA
Collimator (Spot size)	8 mm, 5 mm or 3 mm
Filter	5-position automatic filter changer
Elemental range	Mg - U
Color CMOS Camera	optional (640 x 480 pixels)
Dimensions	W x D x H: 13.5 cm x 13.8 cm x 25 cm (9.8 in x 5.3 in x 13.8 in)
Weight	approx. 7.5 kg (15.6 lbs) including battery
Display	9.4 cm (3.7 in), LCD (TFT active matrix), 640 x 480 pixels, 64k color, resistive touchscreen
Testing Modes	Assay, grade ID, grade Pass/Fail, limit testing
Power	Li-ion battery (7.2 V nominal), battery charger, AC adapter (9 V DC @ 3 A)
System safety	Password protection, no sample (backscatter) shutoff, lid detection sensor
Optional accessories	A wide range of optional accessories is available for the CTX. Please refer to the CTX Accessories brochure for complete details. ▪ Secure backpack carrier with wheels ▪ Barcode scanner ▪ Mobile printer ▪ GPS receiver ▪ Laptop kit ▪ Field geo sample preparation kit

All configurations and specifications are subject to change without notice.
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