S1 TITAN

Handheld XRF Analyzer for Elemental Analysis

Handheld XRF

Innovation with Integrity

Portable Elemental Analysis From Mg To U

Fast analysis speed and exceptional accuracy make the S1 TITAN the ideal choice for analyzing and sorting incoming material, finished goods and in-process production parts with the non-destructive XRF spectrometry. The S1 TITAN is a lightweight and rugged handheld XRF analyzer designed to quickly report the elemental composition of a sample. Applications are almost limitless as the S1 TITAN can measure solids, liquids, and powders wherever they are found or used. Typical applications include alloy identification and quality control, scrap metal recycling, precious metals, wear metals in oil, mining, environmental, consumer safety, food safety, and agriculture.

Highlights

- Latest graphene window SDD technology
- Patented TITAN 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 or fully automated Wi-Fi DataStream

Latest Handheld XRF Technology

Using non-destructive XRF spectrometry, the S1 TITAN is ideal for portable element analysis. The ergonomic pistol grip and trigger are designed for all-day use. The color touchscreen LCD is easily seen in all lighting conditions. Weighing just 1.5 kg (3.3 lbs) including battery, the S1 TITAN is among the lightest XRF analyzers on the market.

S1 TITAN Configurations

The S1 TITAN product line is entirely based on the latest detector technology. Every S1 TITAN model is equipped with a high-performance graphene window silicon drift detector (SDD). As a result, users can expect to have fast, precise analysis regardless of the chosen S1 TITAN model.

The S1 TITAN is available in three high-performance configurations, all sharing the same advanced detector technology: S1 TITAN 500, 500S, and 800.

- The S1 TITAN 500 model is an excellent value choice when analysis of light elements is not required. It is designed for the simple and fast analysis of heavier elements, starting from sulfur.
- The S1 TITAN model 500S is the fast and easy-to-use analyzer which can measure both light and heavier elements simultaneously.
- The S1 TITAN 800 is the premium model with the best performance the widest application range and best light element performance for Mg, Al and Si.

Operator Friendliness

Designed as a "point and shoot" analyzer, the S1 TITAN requires minimal setup and operator training. 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 S1 TITAN perfect for both beginning users, as well as power users.

The user interface has been designed to provide intuitive operation and results presentation. Data management and transfer are exceedingly easy to use.

Environmental Conditions

IP54 rated, the S1 TITAN is designed to withstand field operation in all environments, including humid and dusty conditions.

- Sealed against moisture and dust
- Ruggedized with rubber over-molding
- Protected from dirt and windblown dust
- Desktop and benchtop sample stands available for measurement of small and complex samples
- Sample stand for measurement of small and complex samples
- Operating temperature: -10°C to +50°C
- Sample temperature (intermittent use): 150°C for Ultralene® window, 350°C for Kapton® window (max. 5 seconds measurement, min. 60 seconds cool down).

Comprehensive Features

Latest Graphene Window

All S1 TITAN models incorporate a large area graphene window silicon drift detector (SDD). The graphene window 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 with TITAN 800 and 500S models.

Integrated Camera and Small Spot Collimator

The S1 TITAN can be equipped with an integrated camera (640 x 480 pixels) to provide sample visualization and accurate positioning of the measurement spot. The small spot option provides a small measurement area for the isolation of small features to be tested. Thanks to the S1 TITAN'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.

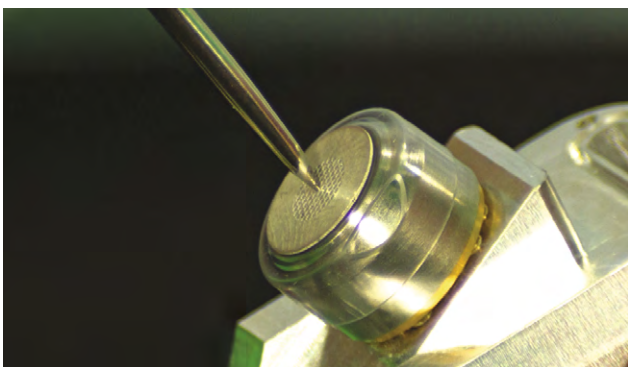
- a small spot isolates a specific sampling area
- the camera ensures accurate measurement positioning
- up to five images per assay can be saved (provides record of measurement spot)
- simple import of images into the reports
- no loss of accuracy with the small spot option

TITAN Detector Shield™ – The Ultimate Defense against Punctured Detectors

This unique patented S1 TITAN 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

S1 TITAN with punctured detector (left) and undamaged detector (right) when fitted with the TITAN Detector Shield™.

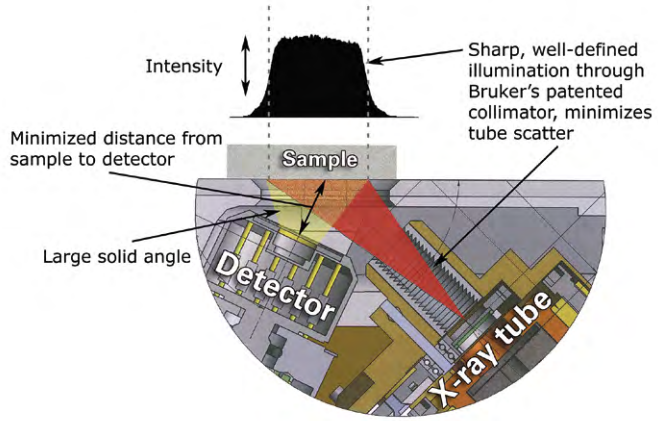


Dart tip on the TITAN Detector Shield™ for size comparison.

SharpBeam™ Optimized Geometry

Every S1 TITAN is precision built with Bruker's patented SharpBeam™ Optimized Geometry including benefits, such as:

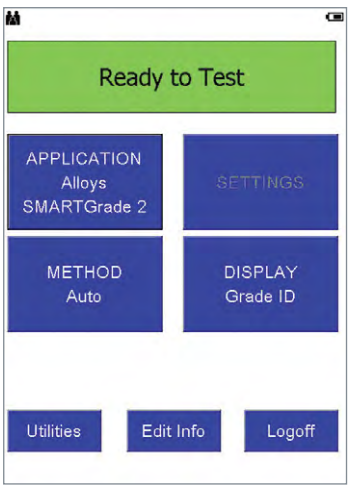
- produces a sharp, defined measurement spot
- improves measurement precision
- reduces power requirements
- reduces stray scatter
- increases battery life
- reduced instrument weight



SMART Grade™ – System Monitored Automatic Run Time

The S1 TITAN 800 alloy application is equipped with Bruker's SMART Grade™ calibration. It automatically determines the optimized conditions and measurement times for each alloy measured.

- pull the trigger and the analyzer does the rest



- 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 S1 TITAN 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.

Data Management

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

- ***Bruker Instrument tools*** communicates with the instrument and manipulate data from the S1 TITAN. Features include: Report generator, Grade table editor, Spectrum viewer, software updates and other features to maintain the instrument.
- ***RemoteCtrl*** connects to your instrument using either Wi-Fi of USB connection. Once the unit is connected you can operate the instrument remotely with your PC.
- ***Bruker Data Stream*** enables automated Wi-Fi data transfer to share, store and backup your measurement data.

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 to the S1 TITAN, a bar code reader and a portable, ruggedized thermal printer.

Applications and Calibrations

The S1 TITAN handheld 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. This flexible and non-destructive handheld XRF can be used in-situ or set up in a desktop stand for small or prepared samples. Results can be viewed as identified metals and alloys, elemental composition, pass/fail using preset concentration thresholds, and full spectra. Typical applications include:

Mining and Geoscience

With its highly flexible measurement options and multi- element sensitivity, the S1 TITAN enables high-quality analyses of mining and mineral samples. S1 TITAN is well suited for ore exploration, drill core analysis and ore grade control.

Metal Alloys

The S1 TITAN is the perfect solution for portable metal and alloy analysis. It is ideal for analyzing and sorting incoming material, finished goods and in-process production parts. Applications include Positive material identification (PMI), metal scrap recycling, metal trace and tramp element analysis, weld inspection, quality control of the correct alloy grade and/or blends, incoming material inspection, precious metals analysis and more.

Environment and Agriculture

The S1 TITAN provides comprehensive field portable solutions to screen for the presence of heavy metals and other dangerous elemental pollutants in air, water and soil, as well as to analyze mineral nutrients in soils, fertilizers and plants.

RoHS and Consumer Safety

The S1 TITAN 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, nondestructive screening of consumer products including toys, clothing, decorative objects and personal care products.

Food Quality and Safety

The S1 TITAN is an essential tool for monitoring additives and process indicators during food production, analyzing mineral nutrients in food and feed, screening for dangerous levels of toxic elements, and identifying foreign physical contaminants found in food.

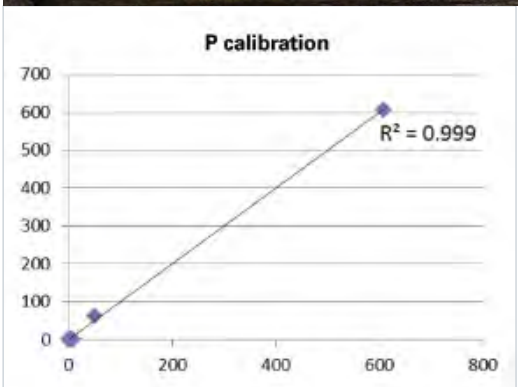
Calibrations

A wide range of different calibration options is available for the S1 TITAN to cover all common applications. Calibrations can be customized to perfectly fit specific requirements. Available calibrations depend on instrument model.

Typical calibration examples are:

- Alloy 2
- Alloy 29
- Precious Metals
- Heavy Metals and Nutrients in Soill
- Food Quality
- Restricted Materials
- Limestone
- Geo Exploration
- Maritime Sulfur (MARPOL)

Soil analysis with the S1 TITAN



Phosphorus is not an edible oil nutrient, its measurement is indicative of the phosphatide content which ultimately helps determine edible oil quality.

Technical Specifications

	S1 TITAN 800	S1 TITAN 500	S1 TITAN 500S
Detection	Graphene window silicon drift detector (SDD), 20 mm² 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	Rh target tube, 2 W, 15 - 40 kV, 5 - 100 µA	Rh target tube, 2 W, 15 - 29 kV, 5 - 100 µA
Collimator (Spot size)	8 mm, 5 mm or 3 mm	8 mm	8 mm
Filter	5-position automatic filter changer	fixed Al/Ti filter	no filter
Elemental range	Mg - U	S - U	Mg - U
Color CMOS Camera	optional (640 x 480 pixels)		
Dimensions	L x W x H: 25 cm x 28 cm x 9 cm (10 in x 11 in x 3.7 in)		
Weight	approx. 1.5 kg (3.3 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, IR proximity sensor		
Optional accessories	There are a variety of optional accessories available for the S1 TITAN. Please refer to the S1 TITAN Accessories brochure for complete details. ■ Benchtop stand with full safety interlock ■ Portable desktop stand (small samples) ■ Barcode scanner ■ Mobile printer ■ GPS receiver ■ Laptop kit ■ Field geo sample preparation kit ■ Alloy check sample kit ■ Weld adapter ■ Belt holster		

Bruker Nano Analytics
Headquarters Berlin · Germany
Phone +49 (30) 670990-0
Fax +49 (30) 670990-30
info.bna@bruker.com

www.bruker.com/s1titan