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BRUKER

S1 TITAN

- Definition of Precision

Handheld XRF

Innovation with Integrity

The S1 TITAN Series Handheld XRF Analyzers

The S1 TITAN series is designed to quickly and accurately report the elemental analysis of your sample. Whether you need to analyze large machined parts, children's toys, or small jewelry, the S1 TITAN will deliver fast and accurate results. The ergonomic pistol grip and trigger are designed for all-day use. The color touch-screen LCD is easily seen in all lighting conditions. Weighing in at just 1.5kg (3.3 lbs), the S1 TITAN is among the lightest tube-based XRF analyzers on the market.

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.

Since XRF is a non-destructive technique, it is ideal for analyzing and sorting incoming material, finished goods and in-process production parts. Applications for the S1 TITAN are not limited to clean manufactured parts; scrap metal sorting, geochemical assays and soil testing are also well within the capabilities of the S1 TITAN. Available calibrations are as diverse as the list of applications, but if you don't find a calibration to match your application, we can customize a calibration to perfectly fit your requirements.




Detector Technology: The S1 TITAN can be configured with either the performance-based Silicon Drift Detector (**SDD**) or the economical Silicon PIN Diode (**SiPIN**) detector.

The high performance CUBE™ SDD technology found in models 600 and 800 operates at very high count rates and thus provides excellent precision at short measurement times. In addition, the SDD allows for measurements of light elements such as magnesium, aluminum, and silicon.

The standard SDD detector, found on model 500, is an excellent value choice. Performance, resolution and analysis speed are far superior to alternative SiPIN detector technology.

The SiPIN detector, found on models 300 and 200, is an excellent value choice when detection of light elements is not required. Good precision and accuracy are achieved using this configuration, but slightly longer measurement times are required.

Easy to use: The S1 TITAN is among the lightest portable tube-based XRF analyzers available on the market today. The user interface has been designed to provide intuitive operation and results presentation. Data management and transfer are exceedingly easy to use.

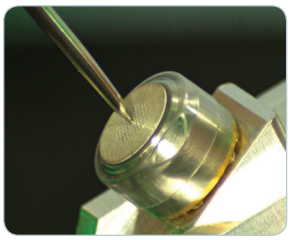
- Intuitive user interface
- Requires very little operator training
- Multiple fields for sample identification
- Lightweight – only 1.5kg / 3.3 lbs, including battery

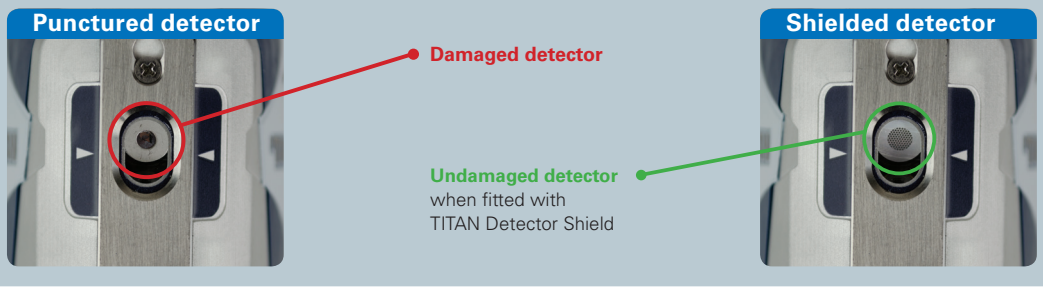
Environmental conditions: IP54 rated; the S1 TITAN is designed to withstand field operation in all environments, including humid and dusty conditions.

- Sealed against moisture and dust
- Ruggedized with rubber over-molding
- Protected from dirt and windblown dust
- 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, 500°C for Kapton® window

TITAN Detector Shield™: The ultimate defense against punctured detectors.
This unique patented S1 TITAN accessory protects the detector window from being punctured by sharp objects like scrap shavings and wire, while still allowing rapid and accurate analysis of almost any material.

- Minimizes costly detector punctures
- Increases equipment up-time
- 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





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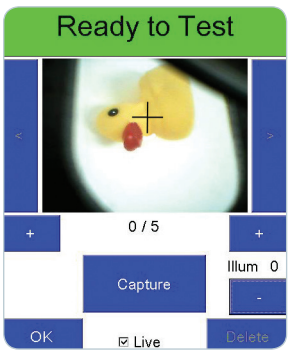
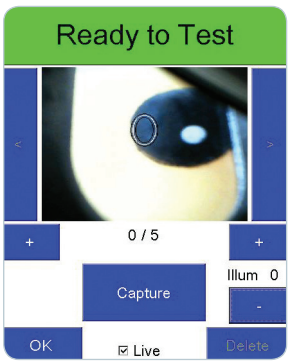
Integrated camera & small spot collimator: The S1 TITAN can be equipped with an integrated camera (640 x 480 pixels) to provide sample visualization and accurate positioning of the measurement spot. The small spot option provides a small measurement area for the isolation of small features to be tested. 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 the measurement time to achieve the desired precision.

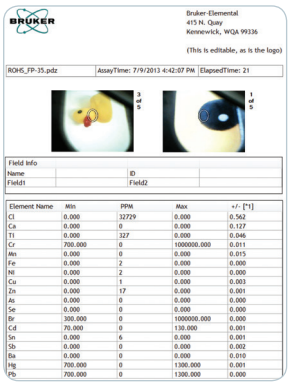
- Small spot isolates specific sampling area
- Camera ensures accurate measurement positioning
- Save up to 5 images per assay (provides record of measurement spot)
- Images easily import into reports
- No loss of accuracy with small spot option



Data Handling:

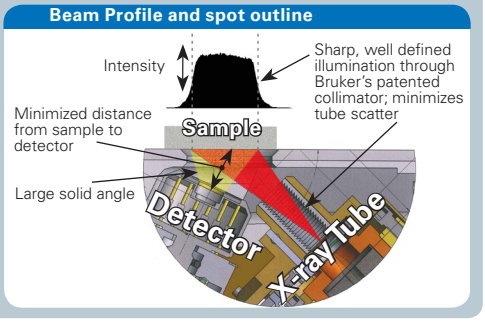
- **Data storage**
  - Images, spectra, sample identification, and results are stored in a single protected file for easy storage and access
  - Results are available in both a protected and unprotected file formats
    - The unprotected file format can be imported directly into Excel or other database 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
- **Bluetooth® wireless accessories**
  - External GPS receiver providing GPS coordinates to the S1 TITAN
  - Portable, ruggedized thermal printer
  - Bar code reader
- **Bruker Instrument Toolbox -** PC software suite for control and communications
  - S1 RemoteCtrl – Software for Wi-Fi or USB remote control of the S1 TITAN
  - Bruker Instrument Tools – Software to communicate with the instrument and manipulate data from the S1 TITAN. Features include:
    - Easy to use report generator
    - Spectrum viewer
    - Grade table editor
    - Software & calibration updates

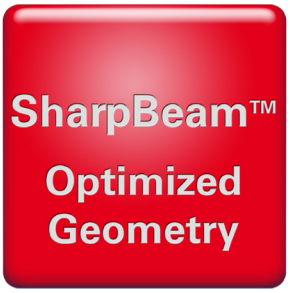




Every S1 TITAN is precision built with Bruker's patented **SharpBeam™ Optimized Geometry** (patent # 8,223,925). Benefits include:

- Produces a sharp, defined measurement spot
- Improved measurement precision
- Reduced power requirements
- Reduces stray scatter
- Increased battery life
- Reduced weight

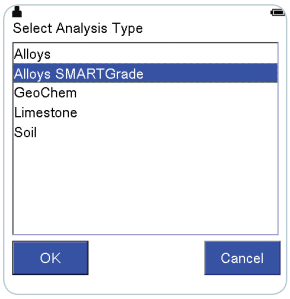




SMART Grade™ (System Monitored Automatic Run Time):

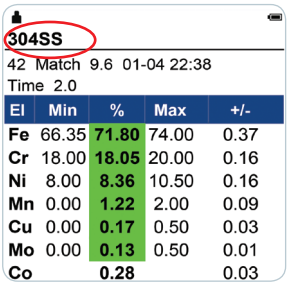
The S1 TITAN 800 and 600, when ordered with an Alloy calibration, are automatically equipped with Bruker's patent pending SMART Grade™ calibration. **This application automatically determines the proper conditions and measurement times for each alloy measured.**

- Pull the trigger and the analyzer does the rest
- Like having an expert operate your analyzer
- Optimum measurement conditions for each alloy
- Multiple condition measurement when required
- Fast measurement (2-3 sec) for standard alloys
- Automatically extended times (10-30 sec) for alloys containing light elements

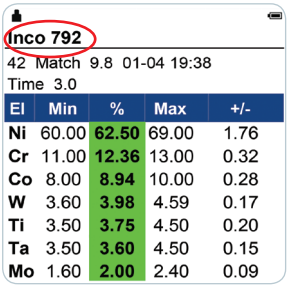


Grade Library: All S1 TITANS ordered with Alloy calibration includes extensive grade libraries (400+ grade definitions) covering various international standards. User selectable libraries: DIN, JIS, GB and others. These libraries cover the following alloy classes:

- Low alloy steels
- Cr-Mo steels
- Tool steels
- Stainless steel
- Specialty alloys
- Nickel alloys
- Zirconium alloys
- Brasses
- Bronzes
- Cobalt alloys
- Zinc alloys
- Aluminum alloys
- Titanium alloys
- Exotic alloys



El	Min	%	Max	+/-
Fe	66.35	71.80	74.00	0.37
Cr	18.00	18.05	20.00	0.16
Ni	8.00	8.36	10.50	0.16
Mn	0.00	1.22	2.00	0.09
Cu	0.00	0.17	0.50	0.03
Mo	0.00	0.13	0.50	0.01
Co		0.28		0.03



El	Min	%	Max	+/-
Ni	60.00	62.50	69.00	1.76
Cr	11.00	12.36	13.00	0.32
Co	8.00	8.94	10.00	0.28
W	3.60	3.98	4.59	0.17
Ti	3.50	3.75	4.50	0.20
Ta	3.50	3.60	4.50	0.15
Mo	1.60	2.00	2.40	0.09

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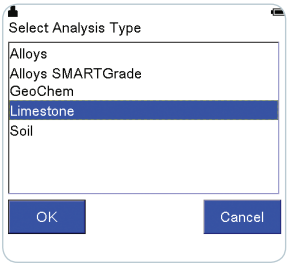
Calibrations: Several different calibration options are available for the S1 TITAN, depending upon the model of interest. Below are some typical examples. For a comprehensive list, please consult with your sales partner

- **Alloy:** Fast single phase measurement for standard alloys (Ti - U) with grade ID and nominal light element concentration support (indirect determination of some light elements).
- **Alloy LE:** Dual phase alloy analysis (Mg - U), including direct measurement of light elements (Mg, Al, Si and P) and extended grade ID; Includes high accuracy type-specific calibrations for most alloy groups.
- **Precious Metals:** Optimized for analysis of jewelry and other precious metal alloy samples, including gold, silver, platinum and palladium alloys. Includes gold karat display.
- **Food Safety:** Includes a number of dedicated calibrations which allows the inspection of food and food contact materials such as packaging and metals. Also includes an application to allow analysis of metal parts, and adapted Restricted Materials Application.
- **Food Quality:** For Nutrients and Fortificants in Foodstuff; Includes powdered check sample. Used to analyze Food and feed Quality at critical points for raw materials, inprocess and finished products.
- **Restricted Materials:** For RoHS I/II, consumer product screening. Auto mode and user selectable calibrations for plastics, mid-density materials, and metals with IEC and user defined compliance limit settings.
- **Limestone:** For the cement, construction and building industry to analyze raw and prepared limestone, cement and gypsum. This calibration is only available for models 800 and 600.
- **Geo Applications:** Optimized for mining, exploration, grade control, drilling and soil screening. For models 800 and 600, this calibration includes GeoExploration and GeoMining for full light element support via three phase measurement.



S1 TITAN Configurations	Excitation	Detector	Elemental Range	Spot Size	Camera
Model 800	6-50kV 4 filters	CUBE™ SDD	Mg - U	8, 5 or 3mm	Included
Model 600	15-50kV 4 filters	CUBE™ SDD	Mg - U	5mm	Optional
Model 500	40kV Fixed filter	SDD	Ti - U	5mm	Not Available
Model 300	15-50kV 4 filters	SiPIN	Cl - U	5mm	Optional
Model 200	40kV Fixed filter	SiPIN	Ti - U	5mm	Not Available

Optional Accessories: There are a variety of optional accessories available for the S1 TITAN. Please reference the S1 TITAN Accessories brochure for complete details. Popular accessories include:

- Benchtop stand with full safety interlock
- Portable desktop stand (small samples)
- Barcode scanner
- Mobile printer
- GPS receiver
- Grinder
- Crusher (impact mortar & pestle)
- Alloy check sample kit
- Weld adapter
- Belt holster

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Bruker (Handheld XRF division), can trace its history back to the early 1980s and the US National Laboratory in Richland, Washington. It was there that a team of scientists from United Nuclear Inc and the US Department of Energy pioneered the early breakthroughs in portable XRF. That led to the formation of Scitec, the company that would later become Bruker.

A lot has changed since those early days. A series of innovations has made handheld XRF technology an indispensable tool in fields as diverse as PMI (Positive Material Identification), art conservation, scrap sorting, petrochemical industries and the NASA space exploration program. S1 TITAN is the latest in a long line of innovations. During this development, Bruker has produced thousands of handheld XRF instruments which have been sold and serviced throughout the world.

1982
Scitec Incorporated

1998
C-Thru acquires Scitec

1999
Keymaster Technologies acquires C-Thru

2001
Keymaster introduces the first tube-based portable XRF

2002
Keymaster/NASA introduces first light element portable XRF

2006
Bruker acquires Keymaster Technologies

2008
Bruker introduces first SDD-based XRF

2013
Bruker introduces TITAN Detector Shield™

1982
Map 1

1994
Map 4

2001
Tracer 1

2002
NASA vacuum instrument

2005
TRACER III-V

2006
OEM Product

2008
S1 TURBO^{SD}

2009
S1 SORTER

2012
S1 TITAN

2013
S1 TITAN
2nd generation

2016
TRACER 5i

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