



# S1 TITAN

## ● Mining & Exploration

Mining requires quick decision making from the best possible data. The S1 TITAN Handheld XRF empowers decision makers to collect more data, quicker. The S1 TITAN is used worldwide in the world's most remote and rugged conditions by mining professionals. The S1 TITAN is a real-time addition in the raw materials value stream, with the unique ability to use your traditional laboratory analysis to confirm and recalculate results, and improve your matrix matched calibration.

The S1 TITAN 600 and 800 with GeoExploration calibration are both equipped with a high performance CUBE™ SDD (Silicon Drift Detector) which is the key to superior operation, as it offers superior count rates and resolution to standard SDD and traditional SiPIN detectors. In addition, the CUBE™ SDD provides the ability to measure light elements like magnesium, aluminum, silicon and sulfur without the need for vacuum or helium purge. Light element analysis allows a more complete

### Benefits:

- On-site geochemical analysis
- GPS/mapping
- Fast, accurate & easy to use
- Rugged and weatherproof (IP54)
- Matrix Matched Calibrations and Recalculation
- Detection of up to 48 elements, including Mg, Al, Si, P and S
- TITAN Detector Shield™
- Available desktop or benchtop stands

understanding mineral deposits, particularly those critical to the measurement of industrial minerals such as cement and limestone.

# Mining & Exploration

## On-site geochemical analysis:

- **Exploration**  
The lightweight portable nature of the S1 TITAN allows it to be used in the field to survey locations of potential mines directly, as well as measuring drill cores to determine the depth profiles of the deposits.
- **Mine analysis**  
Once a mine site has been discovered the S1 TITAN provides the ability to quickly analyze the deposit.
- **Mine control**  
Once the mine has been mapped and production has begun, the S1 TITAN can provide detailed information on the levels of ore in each truck load to allow better control of the flow of ore to the processing plant.
- **Process and concentrate analysis**  
During ore processing the S1 TITAN can determine the concentrations of the sample.
- **Restoration and reclamation**  
At the end of mine operation the S1 TITAN can be used in analysis of tailings and help in restoration of the land.



**Typical Mining results screen**  
11 Match 0.0 03-30 17:42  
Time 50.0

El	%	+/-
Al2O3	12.733	0.454
SiO2	67.541	0.569
P2O5	0.077	0.050
S	0.127	0.019
K2O	3.644	0.030
CaO	0.890	0.015
Ti	0.336	0.006

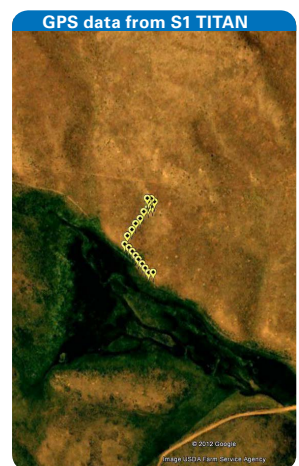
<  Use in Average >

Averaging Calculate Average

Spectrum Edit Info Back

## Mapping:

An essential part of exploration and mine analysis is the correlation of the analysis with the exact location of the measurements. When paired with a Bluetooth™ enabled GPS, the S1 TITAN can store the exact latitude, longitude and altitude of each measurement. The data, stored in ASCII format, can then be readily imported into any GIS or site-mapping application. These coordinates can be downloaded to your PC and imported into a mine mapping program.



## Calibrations:

- Elemental range: up to 48 elements, including Mg, Al, Si, P and S
- Multiple specific matrix calibrations based on traceable standards
- No need for gain check in the field due to Bruker's Continuous Automatic Gain Calibration (CAGC)

### GeoExploration

- Major & trace elements
- Ore pathfinder elements
- Remediation check
- General purpose exploration and soil calibration

### GeoMining

- High concentrations of metals in mineral processing
- Industrial minerals
- Concentrates
- Bauxite



### 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
- Operating Temperature: -10°C to +50°C



### 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 memory or a USB flash drive or both
- 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 RemoteCtl – 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
- Report generation- In some mining applications, the generation of an analysis report is a critical part of the measurement. Therefore, two different PC report generation packages exist for the S1 TITAN family:
  - Included Bruker Instrument Tools provides a simple preformatted report including elemental assay
  - Optional S1 Data Tool is a flexible, user controlled report generator which allows the complete customization of the report format



Element Name	Units	%	Max	+/- [%]
MgO	%	21.877	0	0.893
Al2O3	%	8.727	0	1.632
SiO2	%	49.446	0	0.867
P2O5	%	1.276	0	0.180
S	%	28.676	0	0.196
Cl	%	0.683	0	0.117
K2O	%	0.408	0	0.038
CaO	%	0.336	0	0.039
Mn	%	0.032	0	0.009
Fe	%	24.343	0	0.137
Co	%	0.099	0	0.007
Ni	%	0.306	0	0.039
Cu	%	7.793	0	0.000
Zn	%	0.548	0	0.015
Au	%	0.030	0	0.014
Se	%	0.004	0	0.002
Hb	%	0.002	0	0.002
Ti	%	1.100	0	0.00302992
V	%	1.100	0	0.001115891
Cr	%	1.100	0	0.001979174
Sr	%	1.100	0	0.000386025
Y	%	1.100	0	0.000705642
Zr	%	1.100	0	0.000338631
Nb	%	1.100	0	0.000710407

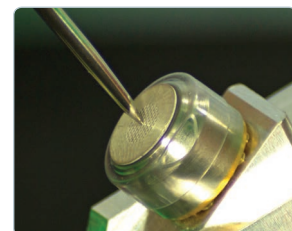


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### Sample preparation:

Measuring directly on a rock face is possible, but this type of non-uniform sample will require extensive averaging to enable a meaningful, quantitative analysis. A more uniform, homogeneous sample, such as a finely ground powder; will result in more accurate assays.

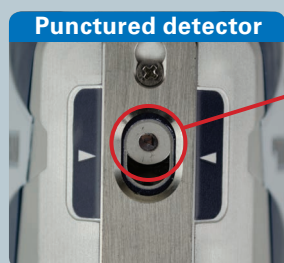
The best solution is to grind the material sufficiently fine and to create a reproducible compacting of the sample by either pressing or tapping. Grinding in the field can be achieved using a variety of accessories that allow you to collect powder directly from the rock face or by "hammering" the sample into a defined powder. The powder can then be pressed into a pellet and analyzed directly with the S1 TITAN.



### TITAN Detector Shield™:

The ultimate defense against punctured detectors. This unique patent pending S1 TITAN accessory protects the detector window from being punctured by sharp objects, 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, Si, P or S



Punctured detector

Damaged detector



Shielded detector

Undamaged detector  
when fitted with  
TITAN Detector Shield

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