



S1 TITAN

● Mining & Exploration

The S1 TITAN Handheld XRF Mining Analyzer is a fast, accurate and easy to use tool for all aspects of mining. Compared to laboratory analysis, the ability to make on-site geochemical analysis of mine face and drill cores boosts productivity by reducing the turnaround time from days to minutes. With the S1 TITAN, real-time surveys can quickly define ore boundaries and identify areas of highest potential profit. Prepared samples can be measured in the field to achieve higher accuracy.

The S1 TITAN 600 and 800 with GeoChem calibration are both equipped with a FAST 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 FAST 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 understanding of most mineral

Benefits:

- On-site geochemical analysis
- GPS/mapping
- Fast, accurate & easy to use
- Rugged and weatherproof (IP54)
- Detection of up to 45 elements, including Mg, Al, Si, P and S
- TITAN Detector Shield™
- Available desktop or benchtop stands

based deposits, as well the mineralogy. In addition, light element analysis is critical to the measurement of industrial minerals such as cement and limestone.

Handheld XRF

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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

| EI | % | +/- |
|-------|--------|-------|
| 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 |

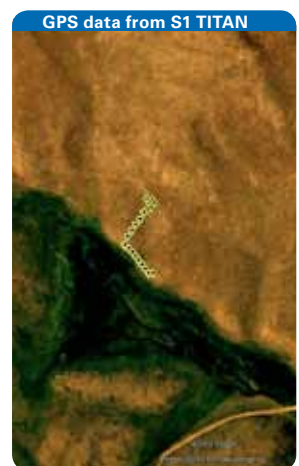
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Averaging Calculate Average

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 45 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)

GeoChem Trace

- For trace elements
- Ore pathfinder elements
- Contaminants in soil or sediment
- Remediation check
- Catalytic converter

GeoChem General

- Major & minor elements
- Includes base metal ores
- 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
- S1 TITAN Toolbox - PC software communicates with & controls the S1 TITAN
 - S1 RemoteCtl – Software for remote control of the S1 TITAN
 - S1 SYNC – 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 can be an important part of the measurement. Therefore, two different PC report generation packages exist for the S1 TITAN family:
 - Included S1 Sync 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 | Value | Unit | Limit |
|---------|-------|------|-------|
| Fe | 27.29 | % | 100 |
| W | 12.66 | % | 100 |
| Cu | 1.78 | % | 100 |
| Ni | 0.26 | % | 100 |
| Pb | 0.06 | % | 100 |
| S | 0.01 | % | 100 |
| O | 0.00 | % | 100 |

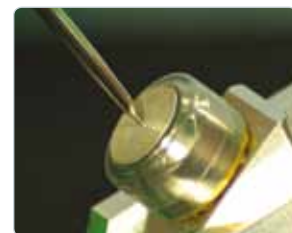


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Sample preparation:

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



Damaged detector



Undamaged detector
when fitted with
TITAN Detector Shield

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