



S1 TURBO^{SD}

● Technology you can trust

Long history of the innovators in handheld XRF



1982
Map 1

1982
Scitec Incorporated



1994
Map 4

1998
C-Thru acquires Scitec
1999
Keymaster Technologies acquires C-Thru



2001
Tracer 1

2001
Keymaster introduces the first tube-based portable XRF



2002
NASA Vacuum Instrument

2002
Keymaster/NASA introduces first light element portable XRF



2002
OEM Product Version 2



2005
TRACER III-V



2006
OEM Product Version 4

2006
Bruker AXS acquires Keymaster Technologies



2008
S1 TURBO^{SD}

2008
Bruker AXS Handheld introduces first SDD-based XRF



2009
S1 SORTER

Bruker Elemental, Handheld XRF, 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 Elemental.

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 TURBO^{SD} is the latest in a long line of innovations, representing the first portable XRF analyzer to incorporate Silicon Drift Detector (SDD) technology. During this development Bruker Elemental has produced thousands of handheld XRF instruments many of which were sold through a major OEM relationship.





S1 TURBO^{SD}

Fast Alloy Analysis

The S1 TURBO^{SD} based on Bruker's proprietary X-Flash[®] silicon drift detector (SDD) provides rapid alloy analysis and light element analysis.

S1 TURBO^{SD}



So what makes the S1 TURBO^{SD} such an important innovation in this field? The key is the Bruker X-Flash[®] Silicon Drift Detector (SDD), which offers count rates and resolution far superior to alternative SiPIN detector technology. This makes for even faster analysis – one second for grade identification, two seconds for assay¹. That's about five times faster than previous generations.

Not only that, but the improved resolution and count rates means lower detection limits for all elements analyzed. Combine that with an extensive grade library and you have one of the most powerful handheld analyzers currently available on the market. To complete our package we offer world class customer service and maximum uptime.

1. When light elements such as Mg, Al and Si are measured longer measurement times are required.

● The S1 TURBO^{SD}



The benefits at a glance

- The first ever SDD-based handheld analyzer
- Superior count rates and resolution
- Five times faster than previous generations
- Lower detection limits
- Grade library covers low alloy steel, tool steel, stainless steel, nickel alloys, cobalt alloys, copper alloys, aluminum alloys, titanium alloys, zirconium alloys and tungsten alloys
- Easy analysis of light elements, such as magnesium, aluminum and silicon, without the need for vacuum or helium atmosphere (S1 TURBO^{SD} LE only)

Clarity and usability

The best technology should be intuitive and instinctive to use. The bright display makes it easy to read in any lighting conditions. The touch screen means you can operate the whole instrument with one finger, whether inputting a password or starting the analysis. The operating system is Microsoft Windows – so well known that it's almost universal. Data transfer options include Microsoft ActiveSync via USB cable or wireless Bluetooth connection, as well as using an SD card. Built-in memory also makes it possible to store thousands of spectra and millions of results safely.

PMI Application



When it comes to Positive Material Identification (PMI), the S1 TURBO^{SD} provides a fast, easy and completely non-destructive analysis method for every metal component. Within the petrochemical industry, that can apply to everything from a single component up to miles of pipeline. This is particularly important in an industry where many 'extraordinary' events have been traced to the installation of the wrong metals, which then leads to faster corrosion rates, or directly to an outage or explosion.

Exactly the same principle applies in the fabrication process, where alloy verification is a required part of Quality Assurance. 100% alloy verification is now a common part of ISO9000 certification for many fabricators. This is especially the case when the parts in question are designed for use in petrochemical applications, or other industries that requires high temperature and pressure. Getting the verification right at an early stage prevents any possibility of a costly alloy mix-up, dramatically reducing scrap and improving product quality.

● Application



Flexible operation

The Universal mode of operation automatically selects the appropriate alloy class and type of calibration – providing truly point and shoot operation. The standard calibration of the S1 TURBO^{SD} rapidly provides a traceable analysis. For those alloys which fall outside of the range of this standard calibration the analyzer automatically selects a fundamental parameters (FP) calibration which is ideal for unknown samples.

The S1 TURBO^{SD} is an instrument designed for use in the real world. The unit works flawlessly regardless of the sample size or a small distance between the sample and the analyzer². The S1 TURBO^{SD} also comes with a large grade library, which you can easily update and edit to allow for local grades or unique names of particular alloys. This can be expanded to include thousands of grades, most of which can be identified within a second or two³.

2. When measuring light alloys like aluminum, the sample must be clean, flat and cover the analysis window for accurate measurement.
3. When light elements such as Mg, Al and Si are measured longer measurement times are required.

Scrap Application



Sorting scrap used to be the job of experienced metal sorters, but that has all changed since the introduction of handheld XRF technology. The S1 TURBO^{SD} provides a fast, reliable way of separating the valuable content of scrap and the ability to identify unwanted or 'tramp' elements – without the need for highly-trained operators.

The size of the sample isn't a problem – the analyzer can measure everything from single wires up to big heat-exchangers and other large structures⁴. Thus, today anyone can easily become an expert in scrap sorting.

4. When measuring light alloys like aluminum, the sample must be clean, flat and cover the analysis window for accurate measurement.

- Application



Multiple modes

The Universal Mode of the S1 TURBO^{SD}, automatically selects the alloy type and empirical or FP calibration. This means even the most inexperienced operator can present virtually any type of metal sample to the analyzer and get an accurate analysis almost instantly – a truly point-and-shoot technology.

For added flexibility and control, you can choose between a number of modes when using the S1 TURBO^{SD}. In addition to the Empirical and FP modes of calibration, you can also opt for Dual Mode, in which assays are calculated from multiple sets of conditions to achieve the best possible detection limits. In Auto Mode, the analyzer will determine which calibration is best for the sample in question.

There is also a straightforward Pass/Fail option, which tests whether the sample matches the selected grades. The display will then show a simple Pass (green) or Fail (red), which allows for high-speed sorting by untrained operators.



Radiation Safety

The S1 TURBO^{SD} contains no radioactive material, which means much easier registration requirements, safe transportation, no disposal restrictions⁵ and no need for a wipe test every six months. For extra security, the system also comes in a lockable case and is password protected. A sample sensor checks that the sample is correctly in place before x-rays are generated and a cover is supplied to minimize x-ray exposure when measuring small parts.

Light Metal Analysis

In addition to the standard S1 TURBO^{SD}, there is the option of the enhanced S1 TURBO^{SD} LE, which comes with smart 'light element' technology. This is another leap forward in handheld XRF, allowing for the analysis of light elements such as magnesium, aluminum and silicon without the need for a vacuum or helium atmosphere. This enables comprehensive analysis of aluminum and titanium alloys, the determination of light elements in steel and copper alloys.

Accessories

Standard

- Waterproof carrying case
- Li-Ion battery
- Battery charger
- Calibration check sample(s)
- Hot Surface Adapter (Note: not available on S1 TURBO^{SD} LE)
- Wrist strap
- Standard PDA Accessories
- Replacement X-ray windows
- SD Memory Card
- Memory Card Reader
- Background Plate

Optional

- Holster
- Rod/Wire adaptor
- Additional batteries
- Barcode reader
- Bluetooth Printer
- Calibration software
- PC software with live display of spectrum & element identification
- Small parts stage
- Small parts cover
- Desktop stand
- Benchtop stand
- AC Power Supply
- Shoulder strap

5. No restrictions related to radioactive material disposal, however, local WEEE restrictions may apply.

● Specifications

Module	S1 TURBO ^{SD}	S1 TURBO ^{SD} LE
Weight	2 kg (4.49 lbs) with Batteries; 1.77 kg (3.9 lbs) base weight	
Dimensions	30 cm(L) x 10 cm(w) x 28 cm(H)	
Detector	10 mm ² X-Flash® SDD Detector; peltier cooled; typical resolution 145 eV at 100,000 cps	
Excitation Source	X-ray tube with Ag target; max voltage 40 kV	
Filter	Five position filter changer	
Environmental Range	-10°C to 50°C	
Sample Temperature	to 500°C	to 150°C
Calibration Range (Depending on Calibration)	31 elements	36 elements including Mg, Al and Si
Standard Alloy Library	Tool Steel, Low alloy steel, Stainless Steel, Cobalt, Nickel, Copper, Titanium, Aluminum, Zirconium, Tungsten, Zinc alloys	Same including light elements
Testing modes	Grade ID (Emperical); PMI (FP); Dual; Universal; Pass/Fail	
Power	Li-Ion battery; 6 hour operating time per battery; AC adapter is optional	
Display	240x320; 65,536 colors; back lit; touch screen	
Security	IR Samples Sensor; password protection; no sample (backscatter) Shutoff	
Data Storage	512MB Memory Card allows for storage of thousands of spectra and millions of results; larger memory cards available	
Data Transfer	ActiveSync via USB or wireless Bluetooth; Memory card	
Languages Supported	English, Chinese, Korean, Japanese, Russian, German, Italian, French, Dutch, Polish, Spanish, Spanish (Mexican), Portuguese	
Certification	CE, cTÜVus, IEC 61010-1:2002 by TÜV SÜD	

Worldwide Support; Local Service

Bruker has been in this business for many years and we understand the critical importance of post-sales service to our clients. That's why we not only design our products with maximum uptime in mind – we provide a two year warranty on our products⁶. We will provide exceptional service on your instrument from a service center close to you.

We are also a company with global scale and presence. Our support staff are based in offices throughout the world, so knowledgeable and comprehensive service is always close at hand.

When it comes to service contracts and warranties, we offer the kind of flexibility and coverage that others find hard to match. At any time during your two-year warranty period, you can decide to add extended coverage, either on an annual basis or through a discounted package of coverage for three years. Just let us know what works for you.

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⁶. See Terms & Conditions for details.