AllScan® combines a rugged construction with the most recent advances in PGNAA technology to deliver the most affordable, accurate, and easy-to-install analyser of its kind in the world.
Why use Online Elemental Analysis?

Online Elemental Analysers provide the ultimate in continuous real-time coal quality measurement, by performing a complete on-line elemental analysis of a moving stream of coal on a conveyor. This allows real-time control of processes and allows cost savings by reducing material handling and enabling immediate decisions for controlling material quality. Online Elemental Analysers are widely used in mining and blending, and have two key advantages over conventional Ash Analysers:

(i) A much higher tolerance to changing coal types (eg from different seams), eliminating the need for multiple calibrations.
(ii) They provide much more information than just Ash, as they directly measure individual elements like Fe, Al, Si, K, S, Ti, Ca (the AllScan® also directly measures moisture, ash, specific energy/volatiles).

Why AllScan®?

Unrivalled accuracy and responsiveness

AllScan® incorporates a sophisticated algorithm - DuraG(TM) - that separates the effect of belt loading and profile variation on the measured spectra from the effect of elemental variation on the elemental spectra. DuraG(TM) dramatically reduces measurement error. AllScan® also includes - Durasum(TM) - a powerful algorithm that eliminates the need for time-based averaging of data in order to obtain stable results. This means that significant changes in elemental composition are reported almost instantaneously, rather than minutes later. This in turn allows for rapid operational control.

These breakthrough technologies combine with the reliability of the PGNA(A) measurement technique to deliver the most accurate and responsive coal elemental analyser on the market today. New cutting edge design eliminates the need for Air-conditioners to cool the electronics. The AllScan package is provided in a small footprint fully contained, and the smallest PGNA on the market. The AllScan comes with an intrinsically safe source on/off source drive mechanism.

Why Real Time Instruments?

RTI have over 15 years of experience in supplying and servicing these types of Analysers to the coal industry in Australia. Our reputation for Quality and excellent Field Service and Support has led us to become the leading supplier in Australia. RTI provides the total package of Analyser plus radiotracers, and we take care of all radiation related requirements.

What is PGNAA?

Prompt Gamma Neutron Activation Analysis.
It is the best suited and most widely used technology for online elemental analysis of coal.

Prompt Gamma Neutron Activation Analysis (PGNAA) is a non-invasive technique for the determination of the elemental composition of materials. It is based on the principle of radioactive neutron capture, where neutrons are emitted from a source and interact with the material to be analysed. The emitted gamma rays are detected and the elemental composition is determined by analyzing the energy and intensity of the gamma rays.

PGNAA is widely used in various industries, such as mining, oil and gas, and food and agriculture, for the determination of elemental composition. It is particularly useful for the analysis of coal, where it can provide a complete analysis of the elemental composition of the coal, including Ash, moisture, and sulfur, within seconds.

PGNAA has several advantages over other analysis techniques. It is non-destructive, allowing for real-time analysis without the need to physically remove samples. It is also non-invasive, allowing for continuous analysis without interrupting the flow of the material being analysed. Additionally, PGNAA is highly accurate and can provide a complete analysis of the elemental composition of the material being analysed.

PGNAA is also highly sensitive, allowing for the detection of trace elements that are not easily detectable by other techniques. It is also highly versatile, allowing for the analysis of a wide range of materials, including coal, minerals, and organic materials.

PGNAA is a powerful tool for the analysis of coal, providing accurate, real-time information that is essential for the efficient and cost-effective operation of mining and processing facilities.
Conventional PGNAA analysers are sensitive to Chlorine, but with the AllScan Dura-G technology RTI can measure on high chlorine belts without the usual adverse affect to the analytical performance.

**Results.**

The AllScan® directly reports the individual amounts of Fe, Al, Si, K, S, Ti, Ca etc. From this it can calculate an accurate Ash Value. Importantly, the AllScan® measurement of Ash is independent of changing coal composition so that coal flows from different seams do not require recalibration of the analyser (see Figure 1).

**Moisture.**

The AllScan incorporates state of the art technology deriving Moisture from elemental composition eliminating the need for a second analyser dedicated to moisture measurement. Unlike other technologies the AllScan samples the entire bed depth of coal ensuring an accurate representation. Other parameters such as SE and Volatiles can also be reported.

The AllScan® is well suited to all coal types, from high/variable Ash feed, to low Ash product.
Safety.

Through improved design, AllScan® can employ smaller sources thus reducing dose rates and permitting operators to safely stand next to or near the Analyser and work safely near the entrance or exit of the conveyor with minimal exposure.

The source is contained in a fireproof and drop-tested housing and has an automatic fail safe as standard.

The source can also be switched to the “off” position from the walkway (even while the conveyor is running) to further reduce exposure, so maintenance can be undertaken in and around the analyser.

Installation.

The AllScan® is designed to mount on the support rails of a conveyor system and consists of four main sections: two side assemblies, the top with source assembly, and the detector box that mounts between the conveyor and return belts. Individually, each section can be lifted into place by a crane.

The small size and weight of AllScan® greatly simplifies installation as it can fit on to most conveyor structures without any alteration. In addition there is minimal intrusion onto walkways.

Technology.

The system utilises the most advanced software algorithms for spectra stabilisation and deconvolution including innovative treatment of signal noise and pulse pile-up. The system is a “stateless” machine which means that once a calibration standard is run or dynamic calibration data is obtained it can be run and re-run as many times as desired to optimise the calibration and performance of the Analyser. This unique feature means the Client can minimise the effort to get the unit up and running so it begins adding value to their operation in a very short time.

The Analyser software archives all incoming spectral information rather than converting the spectrum to data and archiving only the data. The archiving of spectra proves very useful whenever there is a desire to add data to the existing calibration database. In this way the calibration is continually refined, being made more robust, precise, and accurate.

I/O and Diagnostics.

The AllScan® comes with a browser based touch panel interface in the control cabinet, allowing immediate access to all data and functions including trending displays.

A variety of interface protocols are available and the system can be set up to suit user requirements. Options include:
- PLC Interface
- Ethernet
- Serial Communications such as ModBus.
- 4 - 20mA

Complicated wiring between the Analyser and the Control Centre is eliminated.

In addition a 3G interface is included so that data is uploaded automatically to a secure site. This provides an alternative way to view and retrieve data, that is completely independent of site communication infrastructure, providing a backup in case of site communications issues, and allowing simple remote monitoring over the internet. It greatly assists fast remote diagnostics and troubleshooting by RTI engineers.

Data is downloaded daily to compile reports sent to the user on a monthly basis. The report includes system diagnostics, and a secure backup of software and calibration for rapid system recovery in the unlikely event of failure.

All diagnostics are performed by the on-board computer, which provides continuous verification of the detector and electronics and verification of the status of components in the computer. This information is accessible to RTI Engineers remotely via the Internet through the 3G interface. The Analyser can also automatically send an email to the AllScan® support team to report any errors/faults.
### Specifications.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Technique</td>
<td>Prompt Gamma Neutron Activation Analysis (PGNAA).</td>
</tr>
<tr>
<td>Elements Measured</td>
<td>Fe, Al, Si, K, S, Ti, Ca and others. Total Ash calculated using elements found in Ash.</td>
</tr>
<tr>
<td>Moisture and BTU</td>
<td>Included as standard.</td>
</tr>
<tr>
<td>Weight</td>
<td>1200 - 1500kg typical.</td>
</tr>
<tr>
<td>Belt Widths</td>
<td>750 - 2400mm (30 - 96 inch).</td>
</tr>
<tr>
<td>Aperture</td>
<td>Variable; height of the tunnel should be sufficient to clear the material that flows through it so the Analyser does not sustain damage from materials on the belt. <em>AllScan</em> Analysers can be easily adjusted for the appropriate tunnel height during manufacture and installation. Customer should provide means of preventing large rocks from striking the Analyser.</td>
</tr>
<tr>
<td>Source</td>
<td>20µg Cf-252 (2.6 years half-life). Source is topped up with 10µg after 2.5 years and again after 5 years. Disposal occurs at 7.5 years.</td>
</tr>
<tr>
<td>Source Holder</td>
<td>Automatic Source Drive with automatic fail safe in event of power loss, Physical Isolation Point. Complies with all radiation safety requirements.</td>
</tr>
<tr>
<td>Radiation Exposure</td>
<td>Typically below 5µSv/hour outside and around the exterior of the Analyser. Average 1.3µSv/hr on or near the catwalk beside the Analyser.</td>
</tr>
<tr>
<td>I/O Protocols Available</td>
<td>Set up to suit application. Standard ModBus over RS485 and 3G interface. User Optional PLC Interface, Ethernet, Serial Communications such as ModBus.</td>
</tr>
<tr>
<td>Environmental Conditions</td>
<td>Sensitive parts of the <em>AllScan</em> are sealed from the environment. The Analyser is designed to operate in all outdoor weather conditions from -10 to +50 degrees Celsius in high or low humidity or precipitation.</td>
</tr>
<tr>
<td>Power</td>
<td>Instrument quality 120/240VAC 1Ø 2400W 50/60Hz at Analyser Control Station.</td>
</tr>
<tr>
<td>Control Cabinet</td>
<td>Stainless Steel IP66 as standard.</td>
</tr>
<tr>
<td>Frame</td>
<td>All framing members and fasteners are stainless steel.</td>
</tr>
<tr>
<td>No Belt Weigher Required</td>
<td>The <em>AllScan</em> analyser does not require a belt scale input to function. Proprietary technology makes the requirement for a feed rate input obsolete.</td>
</tr>
</tbody>
</table>

### Locations.

**Americas | Asia | Europe | Oceania | Africa | Middle East**

**Global Headquarters**

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