Agilent Case Study: Intertek

Analysing over Two Million Mineral Samples Per Year In A 24/7 Operation Requires Robust, Reliable Instruments

Global mineral testing company, Intertek Minerals, uses Agilent atomic spectroscopy instruments to provide highly accurate, rapid turnaround analysis for the exploration and mining industry.

Agilent spoke to Dr. Matthew Witham, Chief Chemist at the Intertek Minerals Global Centre of Excellence in Perth, Australia. The company is a global quality assurance company, with over 1000 laboratories in 100 different countries. The Minerals Global Centre of Excellence is Intertek's largest Minerals laboratory worldwide and is also one of the largest commercial mineral laboratories in the world. The site makes extensive use of technology to automate laboratory processes in provide their customers with fast, efficient analytical testing.

Q. What does Intertek Minerals do?

A. Intertek Minerals provides mineral testing services throughout the mine lifecycle, from exploration geochemistry, mine-site laboratory services, minerals inspection, sampling and analysis, robotic laboratory solutions, environmental services, and metallurgical testing services. These services also extend across the mining supply chain.

Here at the Global Center of Excellence, we analyze over two million samples per year. We have over 500 employees at the site, and we operate 24/7.

Many of the samples we receive are varied in concentrations, they could be highly concentrated samples or very low-level exploration samples. With such a large number of samples of unknown elemental content, we need our instruments to be robust and to be able to handle the wide range of different sample types.

Agilent

Trusted Answers

Q. Can you tell us about the types of atomic spectroscopy instruments you have?

A. Intertek now has 54 Agilent atomic spectroscopy instruments within our Australian labs, as well in our global locations such as the Philippines and in Indonesia.

We have a range of different atomic spectroscopy instruments, to support the wide variety of samples we receive. Instrumentation includes flame AA instruments for the analysis of single elements, such as gold from our fire assay process, as well as copper analysis from our cyanide leachate. These instruments are also very suitable for our mine-site laboratories as they're very robust and easy-to-use.

We use our ICP-OES instruments for cost-effective analysis of ore grade samples, where very low detection limits do not provide a value-added service.

Our ICP-MS capabilities are very interesting for our exploration customers, particularly those looking for high-value elements, such as our precious metals or rare earth elements, where they may be in low abundance.

Q. When did you install the Agilent triple quadrupole ICP-MS instruments and why did you purchase them?

A. The three Agilent ICP-MS triple quad instruments were installed in 2022, within our Global Centre of Excellence, with an additional two being installed the following year. These instruments can provide us with interference-free, low detection limit analyses. Our customers benefit from research-quality results from a commercial lab.

One of the benefits of these new instruments is the low detection limit for the analysis of selenium. Selenium's most abundant mass is 80. This interferes with the argon-argon molecule, which also occurs at mass 80. The triple quadrupole instrument allows us to remove that argon interference and provide us with really low detection limits for selenium.

Q. What advantages do the Agilent instruments offer you?

A. We particularly like Agilent Instruments due to their robustness and their ability to analyze a wide range of samples, from high concentration process samples, immediately followed by low concentration samples. The Agilent ICP-OES instruments, for example, can simultaneously capture the entire emission spectrum for each sample. This is particularly advantageous when measuring copper, because it allows us to choose the most suitable emission line for that sample, based on its concentration.

The Agilent instruments can also handle a wide range of sample matrices, from those with a high total dissolved solids—such as our peroxide and borate fusion methods—down to our low-level, multi-acid digestion samples.

Q. Why did you decide to buy only Agilent instruments?

A. One of the main drivers for converting our entire instrumentation fleet to Agilent was the technical support provided. This is not just within our facility within the city of Perth. We also need support for our remote mine site locations in the Pilbara, Goldfield's region, and around the rest of Australia. We were particularly thankful for Agilent's ability to provide us with technical support during the trying times of COVID lockdowns, which many other suppliers weren't able to offer.

The newer Agilent instruments have allowed us to increase our production. The in-built tools within the instruments have allowed us to decrease our sample read times and thus measure more samples each day.

Also, the ICP-MS technique is well known to suffer from interferences. We find that using helium mode within the collision reaction cell of our Agilent ICP-MS provides us with great removal of interferences.

Q. Can you describe the laboratory workflow?

A. We receive mineral samples that are typically in the form of drill core, rock chips, or soil samples. These samples are dried, crushed, and pulverized, and undergo a stringent quality control check to ensure that they're ready to be analyzed within the laboratory. Once the samples have been prepared, they're then delivered to our wet chemistry laboratory, where they undergo numerous digestion methods to prepare the samples for ICP analysis. Our digestion lab has the capacity to process over 4500 samples per day.

After digestion, the samples are delivered to our dilution room. Our automated dilutors dilute the samples down to a concentration suitable for analysis on ICP-MS. However, our ICP-OES instruments can analyze samples without dilution.

The samples we run through our instruments are typically acid-based. This causes significant issues with corrosion, so we've set up a clean environment for our ICP instruments to maximize

their useful life. This has been so effective that one of the Agilent 7700 ICP-MS instruments is still operating after 10 years. These instruments run 24 hours a day, 365 days per year, and we can complete our daily maintenance activities in less than 15 minutes per day.

Q. What is planned for the future?

A. Intertek is very excited about the future of ICP analysis. We strive every day to achieve lower detection limits and better accuracy. We believe that the Agilent-provided ICP-MS triple quad instruments will help us achieve those goals. We can use these instruments to provide low detection limit, interference-free analysis, which is very attractive to our customers. Our customers value high-quality results in the fastest time possible, so we strive to provide that for our customers.

In an increasingly complex world—remote exploration projects and mines, complex ore bodies, and increasing cost pressures—Intertek can provide the innovative bespoke solutions needed to support our clients to meet these challenges. With industry-recognized technical expertise and an established global network, Intertek offers end-to-end total quality assurance across our clients' entire resource development chain.

www.agilent.com/chem/icpms

DE56855688
This information is subject to change without notice.

Published in the USA, July 8th, 2024
5994-7501EN

Agilent
Trusted Answers