

FACT SHEET

# AQUA REGIA FOR GOLD & EXPLORATION

**Explorers face unique challenges and constraints in a complex global environment in jurisdictions with changing underlying risk fundamentals where undiscovered deposits are becoming harder to find. To maintain the current level of global mining output requires sustained, ongoing exploration investment.**



Obtaining low cost, consistent quality, multi-element exploration data with the requisite detection limits, requires a laboratory partner with focus and dedication to process consistency coupled with the application of the latest cutting edge ICP-MS (inductively coupled plasma, mass spectrometry) technology.

### Our Expertise

Intertek's aqua regia methods have been engineered by our team of application chemists with a focus on minimising process variability for optimal data reproducibility and maximum throughput to facilitate turnaround. Our forefront ICP-MS analytical technology, coupled with a streamlined, ultra clean glassware-free aqua-regia digestion, provides the best platform for fast, cost effective and consistent, trace level analysis for your exploration samples.

### Aqua regia digests

The aqua regia digestion is a classical, empirical digestion technique that has been utilised globally for decades by the exploration community. As a mixture of hydrochloric and nitric acids, aqua regia is a powerful oxidising and complexing agent that can readily dissolve precious metals as well as extract other elements, to a varying extent, from a diverse range of geological matrices. Aqua regia is a partial digest technique for many elements and precise control over the digestion and instrumental processes results

in consistent, high-quality data that find relevance in many geochemical explorations applications. It is particularly useful for the multi element data, including precious metals, which can be obtained from a single digest and in many cases, a single instrument finish.

The formation of polyatomic species such as argides and oxides in the plasma of the ICP-MS has hitherto resulted in numerous interferences which have limited advances in lowering detection limits. ICP-MS technological enhancements have, however, significantly reduced the formation of these interfering species, improved the signal to noise ratios and resulted in detection limits significantly below the crustal abundance (Clarke value) for most trace elements of geochemical significance. This integrated approach allows for the identification of subtle geochemical trends, delineation of low level anomalies (especially important for gold) and coupled with unsurpassed long-term precision, the Intertek aqua regia digests facilitate seamless geochemical mapping by eliminating batch effects in spatial geochemical data.

### AR005 Method

#### - The Cost-Effective Exploration Tool

Utilising a 0.5gram sample, the new AR005 method has been engineered by Intertek's application chemists to create an exploration tool with an emphasis on long term consistency of quality and meaningful ultra-low level geochemical data. With an acidic

strength that mimics the larger "traditional" digestions, the data is directly comparable to existing project datasets.

Listed detection limits are commensurate with the crustal abundance of almost all elements. This approach allows for the identification of subtle geochemical trends, delineation of low level anomalies and coupled with unsurpassed long-term precision, the digest facilitates seamless geochemical mapping by eliminating batch effects in spatial geochemical data. The Intertek AR005 development underscores the following features:

- Both ICP-MS and ICP-OES finishes are available in customisable packages to suit every budget and exploration application.
- Minimisation of polyatomic species which are the most prevalent form of interference in mass spectrometry.
- Precise control on digestion parameters, instrument stability and instrument sensitivity produce low level data with unparalleled long term reproducibility.
- Ultra-clean digestion conditions coupled with ultrapure reagents eliminate the potential for baseline effects between laboratory batches.
- The AR005 digestion is engineered to closely recover the consensus value on commercially available aqua regia reference materials (CRMs) which facilitates quality assurance.



**Aqua Regia Ultima 53 Element Package**

| ELEMENT   | RANGE PPM     | ELEMENT   | RANGE PPM     | ELEMENT   | RANGE PPM    |
|-----------|---------------|-----------|---------------|-----------|--------------|
| <b>Au</b> | 0.1ppb - 2    | <b>Hf</b> | 0.01 - 1000   | <b>S</b>  | 500 - 5%     |
| <b>Ag</b> | 0.02 - 250    | <b>Hg</b> | 0.01 - 100    | <b>Sb</b> | 0.02 - 5000  |
| <b>Al</b> | 0.005% - 10 % | <b>In</b> | 0.01 - 1000   | <b>Sc</b> | 0.02 - 2500  |
| <b>As</b> | 0.05 - 5000   | <b>K</b>  | 0.001% - 5%   | <b>Se</b> | 0.05 - 5000  |
| <b>B</b>  | 5 - 1%        | <b>La</b> | 0.002 - 2500  | <b>Sn</b> | 0.05 - 1000  |
| <b>Ba</b> | 0.05 - 2000   | <b>Li</b> | 0.05 - 2500   | <b>Sr</b> | 0.05 - 5000  |
| <b>Be</b> | 0.02 - 1000   | <b>Mg</b> | 0.001% - 20%  | <b>Ta</b> | 0.01 - 1000  |
| <b>Bi</b> | 0.02 - 5000   | <b>Mn</b> | 0.2 - 2%      | <b>Te</b> | 0.02 - 1000  |
| <b>Ca</b> | 0.005% - 40 % | <b>Mo</b> | 0.02 - 5000   | <b>Th</b> | 0.005 - 2500 |
| <b>Cd</b> | 0.005 - 1000  | <b>Na</b> | 0.001% - 5%   | <b>Ti</b> | 5 - 1%       |
| <b>Ce</b> | 0.002 - 5000  | <b>Nb</b> | 0.05 - 1000   | <b>Tl</b> | 0.01 - 1000  |
| <b>Co</b> | 0.01 - 1%     | <b>Ni</b> | 0.1 - 2%      | <b>U</b>  | 0.005 - 5000 |
| <b>Cr</b> | 0.2 - 2%      | <b>P</b>  | 10 - 2%       | <b>V</b>  | 0.5 - 1%     |
| <b>Cs</b> | 0.01 - 1000   | <b>Pb</b> | 0.2 - 5000    | <b>W</b>  | 0.02 - 1000  |
| <b>Cu</b> | 0.05 - 2%     | <b>Pd</b> | 1ppb - 500ppb | <b>Y</b>  | 0.01 - 2000  |
| <b>Fe</b> | 0.001% - 50 % | <b>Pt</b> | 1ppb - 500ppb | <b>Zn</b> | 0.2 - 2%     |
| <b>Ga</b> | 0.1 - 1000    | <b>Rb</b> | 0.02 - 1000   | <b>Zr</b> | 0.05 - 1000  |
| <b>Ge</b> | 0.05 - 1000   | <b>Re</b> | 0.001 - 500   |           |              |

Aqua regia digestion 0.5g / ICP-MS

AR005/MS53

| ELEMENT   | RANGE PPM    | ELEMENT   | RANGE PPM    | ELEMENT   | RANGE PPM    |
|-----------|--------------|-----------|--------------|-----------|--------------|
| <b>Pr</b> | 0.002 - 1000 | <b>Gd</b> | 0.002 - 1000 | <b>Er</b> | 0.002 - 1000 |
| <b>Nd</b> | 0.002 - 1000 | <b>Tb</b> | 0.002 - 1000 | <b>Tm</b> | 0.002 - 1000 |
| <b>Sm</b> | 0.002 - 1000 | <b>Dy</b> | 0.002 - 1000 | <b>Yb</b> | 0.002 - 1000 |
| <b>Eu</b> | 0.002 - 1000 | <b>Ho</b> | 0.002 - 1000 | <b>Lu</b> | 0.002 - 1000 |

Add additional REE

AR005/MS53R

**ELEMENT**

Ag, As, Bi, Cd, Cl, Cr, Cu, Fe, Hg, K, Mn, Mo, Ni, P, Pb, Rb, S, Sb, Se, Sn, Sr, Th, Ti, U, V, W, Y, Zn and Zr

Portable XRF scan add on

pXscan

**DESCRIPTION**

Bundled Ultima package (65 elements and pXRF scan)

**CODE**

ARpX01

**Ultimate Exploration Package**

An emphasis on long term consistency of quality and meaningful ultra-low level geochemical data. Bundled with a Portable XRF Scan and the option of a REE add-on this is an Ultimate Exploration Package.

**Additional Capability**

Intertek Minerals offers a full spectrum of analytical techniques to suit almost all analytical geochemistry requirements. Aqua regia data can be checked by 4 acid digests, fusion methods and fire assay data in cases where partial recovery is suspected, or an estimate of the total analyte content is required.

**FOR MORE INFORMATION**

+61 8 9263 0100

[min.aus.sales@intertek.com](mailto:min.aus.sales@intertek.com)

[intertek.com/minerals](http://intertek.com/minerals)