



independent assay laboratories

34 Buckingham Drive Wangara

Perth WA 6065

T: +61 8 9309 3300

admin@ialaboratories.com

www.ialaboratories.com

ABN: 841 364 231 88

Atomic Absorption Spectrophotometer (AAS)? VS Classical Gold

A Tradition of Innovation





Independent Assay Labs (IAL) recommend gravimetric gold assaying as the most accurate method to use for defining gold values.

The fundamental difference is that all the metal in the measuring process (and not just a snapshot of a small percentage of the sample as in instrumental methods).

The method concentrates on accuracy rather than precision, and the absolute accuracy is constant over the entire weighing range. The relative accuracy actually improves with higher values whereas with the instrumental methods it gets worse.

Perhaps not commonly known or understood by non-laboratory personnel is that modern instruments have as their fundamental function the ability to read very small, or trace, amounts of material, not large amounts. This can mean that they may not be best suited to measuring elements at or approaching ore grade. As an example consider the following facts:

Suppose a sample has a gold content of 5 g/T and that a 50g sample is taken for assay. Consider also that the prill from the fire assay is diluted to 10mL after digestion. The solution then has a concentration of:

5 μ /g in 50 grams, or 250 μ g in total

Therefore, the concentration is (250/10) μ g/mL, or 25 μ g/mL (25ppm)

In an AAS reading, a reading could take about 5 seconds. In that time a total of about 0.06mL is introduced into the flame. (The uptake rate is 5mL per minute and only about 10% is aspirated; the rest goes into the drain)

So, of the total of 250 μ g in the sample, only about 1.5 μ g is actually quantified!!

Therefore, because the actual reading is such a small snapshot, it is critical that the reading be accurate. Any variation will translate directly into a variation in the result for the sample.

By comparison, in the gravimetric method, **all 250 μ g** are weighed. Furthermore, analytical balances are intrinsically accurate, if for no other reason than they can internally calibrate themselves (unlike AAS and ICP which must be referenced to external standards). The readings are accurate to the sixth decimal place of a gram (1 microgram), so the theoretical accuracy in the above example is 0.4%.

Although somewhat protracted, the above example is produced to give any concerned person in the industry a meaningful insight into the differences between the methods. Independent Assay Labs believes there should be a

reliable alternative available to verify assays produced by rapid turnaround methods.

The above comments in no way are intended to imply that instrumental methods do not produce correct figures. Quite the contrary, it emphasizes the commendable work done by the laboratories who produce good results using those methods. The above calculations do not touch of the errors of each method, but the AAS or ICP methods have many variables, starting with the accuracy and stability of calibration standards. Gravimetric assays are referenced to the balance masses which are stored internally and re-calibrate automatically when conditions change.