



**CHRYSOS
CORPORATION**
Assays at the speed of light

Performance Note PN-002

Chrysos PhotonAssay™

Concurrent Gold and Silver Services

Executive Summary

PhotonAssay systems offer two services for the concurrent analysis of gold and silver. These services prioritise alternative elements, with gold precision and detection limit optimised by the PAAUAG02 service and silver precision and detection limit optimised by the PAAGAU01 service. This note provides the detection limits and precision at various grades for the two concurrent services.



PAAUAG02: Concurrent Gold and Silver Assay, 2 cycles

Service Code: PAAUAG02

System Settings: 15 s Irradiation, 15 s Measurement, 2 cycles, 8.5 MeV

Max Throughput: 72 samples/hour

Description: Simultaneous assay of both gold and silver, optimised for gold performance. The performance and sample throughput matches that of the PAAU02 standard gold assay (SGA) service and is defined for well characterised certified reference materials with very low to zero concentration of background elements in the table below. The performance metrics are applicable to dry samples and solution samples. The high-grade (H) and very high-grade (HH) services extend the upper detection limit at the cost of worse precision at grades below 100 ppm.

Gold Performance

Parameter	Typical Value
Lower Detection limit (2σ), blanks	0.010 ppm
Precision @ 0.1 ppm	12%
Precision @ 0.3 ppm	6.5%
Precision @ 1 ppm	4.0%
Precision @ 3 ppm	2.5%
Precision > 10 ppm	< 2%
Upper Detection Limit	350 ppm
Upper Detection Limit, PAAU02H	3,500 ppm
Upper Detection Limit, PAAU02HH	10,000* ppm

Precision percentages are reported at 1 SD.

*For samples above 10,000 ppm, contact Chryso for service information.

Silver Performance

Parameter	Typical Value
Lower Detection limit (2σ), blanks	3.7 ppm
Precision @ 10 ppm	20%
Precision @ 30 ppm	8%
Precision @ 100 ppm	5%
Precision > 300 ppm	< 4.5%
Upper Detection Limit	5,000 ppm

Precision percentages are reported at 1 SD.



PAAGAU01: Concurrent Silver and Gold Assay, 1 cycle

Service Code: PAAGAU01

System Settings: 40 s Irradiation, 40 s Measurement, 1 cycle, 8.5 MeV

Max Throughput: 72 samples/hour

Description: Simultaneous assay of both gold and silver, optimised for silver performance. The performance for gold is lower than that of the PAAUAG02 and PAAU02 services. The service performance is defined for well characterised certified reference materials with very low to zero concentration of background elements in the table below. The performance metrics are applicable to dry samples and solution samples.

Gold Performance

Parameter	Typical Value
Lower Detection limit (2σ), blanks	0.03 ppm
Precision @ 0.1 ppm	20%
Precision @ 0.3 ppm	8.5%
Precision @ 1 ppm	4.5%
Precision @ 3 ppm	3%
Precision > 10 ppm	< 2.5%
Upper Detection Limit	350 ppm
Upper Detection Limit, PAAU02H	3,500 ppm
Upper Detection Limit, PAAU02HH	10,000* ppm

Precision percentages are reported at 1 SD.

*For samples above 10,000 ppm, contact Chrysos for service information.

Silver Performance

Parameter	Typical Value
Lower Detection limit (2σ), blanks	1.5 ppm
Precision @ 10 ppm	11%
Precision @ 30 ppm	6%
Precision @ 100 ppm	6%
Precision > 500 ppm	< 4.5%
Upper Detection Limit	5,000 ppm

Precision percentages are reported at 1 SD.



Background Elements

- The presence of uranium, thorium or barium will decrease the gold and silver precision, particularly at lower grades, and increase the detection limit.

Interfering Elements

- Elevated levels of bromine or erbium will flag “Interfering Element Corrected (IEC)”. Gold and silver values are still reported. The correction assumes low levels of high-atomic number elements such as lead.
- Significantly elevated levels of bromine or erbium will flag “Interfering Element (IE)”, with no gold or silver value reported.

Attenuating Elements

- Samples with more than approximately 5 wt% lead (depending on sample density) will flag “Low Transmission (LT)” with no silver grade reported. The gold grade will report as normal.

Moist samples

- Substantially solid (non-liquid) samples with moisture levels up to approximately 30% can be measured.
- The typical moisture error is 3.0-3.5 wt% which will add between 0.5% (at low grade levels less than 0.3 ppm) to 2% (at higher grade levels greater than 10 ppm) to the relative Au precision.
- Moisture calibration and hence impact on gold precision is site specific and depends on whether hydrogen is present in the sample in a form other than water that is released during drying, so the quoted impacts on Au precision are indicative only.

Alternative Silver services

- Silver measurement in the presence of high levels of lead and gold may be optimised via a future silver service operating at 12 MeV. Please contact Chrysos for more information.

